

PRACTICAL PROBLEMS

IN

ARITHMETIC.

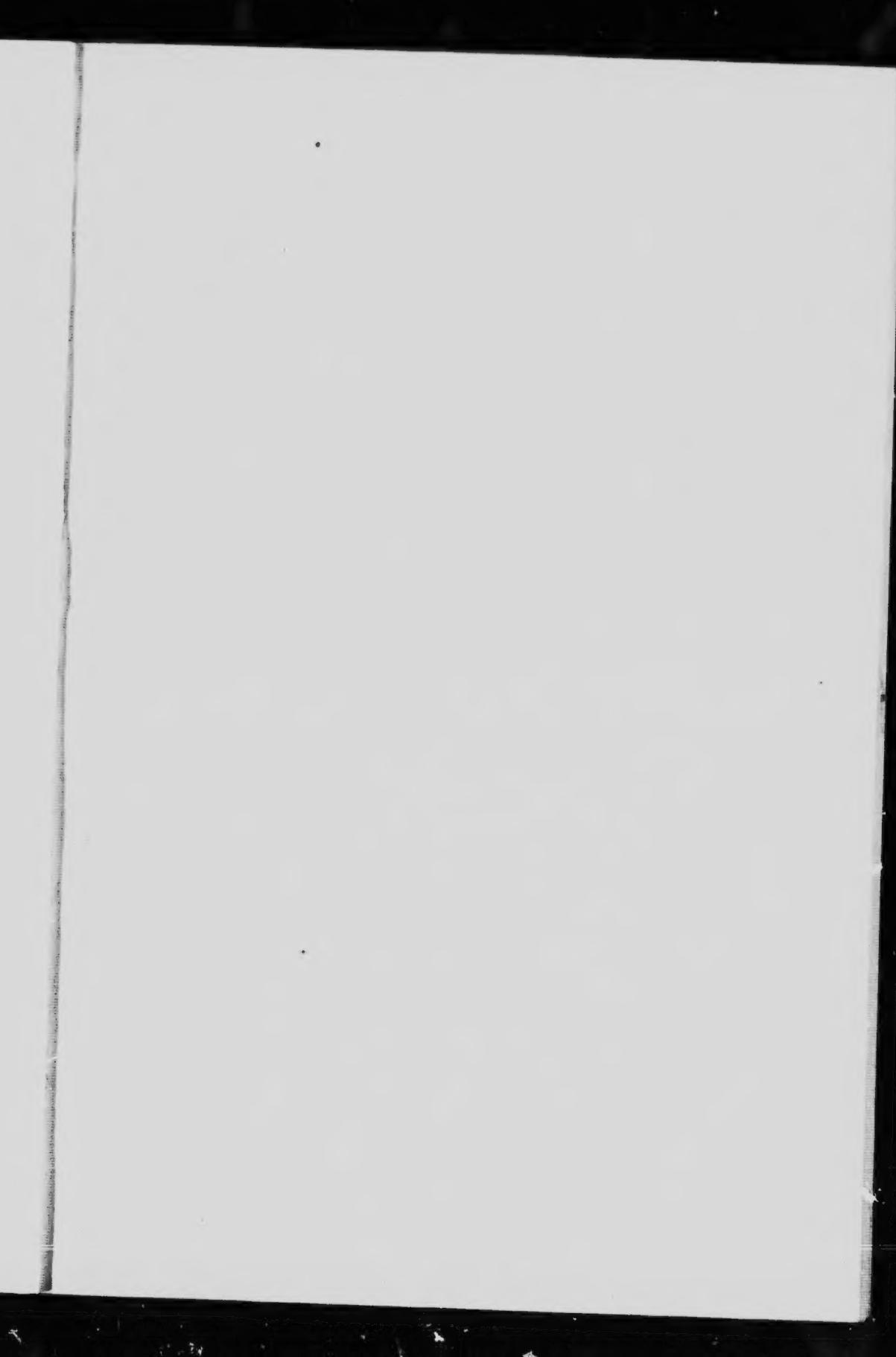


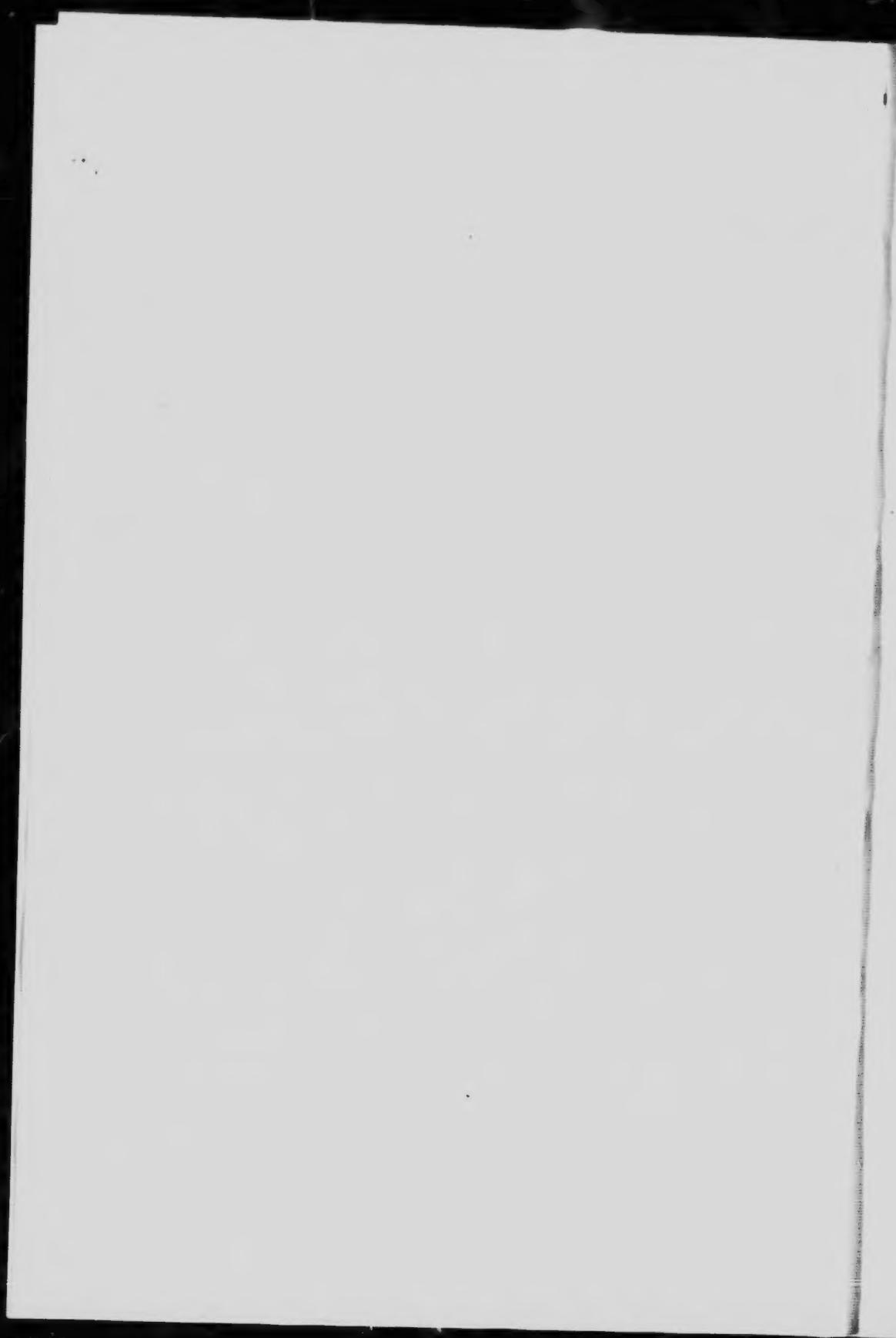
McCormac.











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# PRACTICAL PROBLEMS

**IN**

# ARITHMETIC

**FOR THE USE OF**

**SENIOR CLASSES IN THE PUBLIC SCHOOLS**

**AND MORE ESPECIALLY FOR THE USE OF CANDIDATES  
PREPARING FOR EXAMINATIONS**

**BY**

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*Inspector of Public Schools, Prince Edward Island.*

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## PREFACE.

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ARITHMETIC, it seems, is the subject which receives the lion's share of attention in the majority of our public schools ; yet it is doubtful if the results attained are what they should be. An old criticism on Arithmetic as generally taught in schools is that the work being done is only the guessing of so many riddles ; that the pupil learns the rules in order to perform "a set of sums," and having learned "the trick" he hastens "to cipher out" all the problems under the formula in the same mechanical way. Certainly, there is in many schools growing up a schoolish dexterity in manipulating figures and finding answers, to the neglect of a proper understanding of the principles, or even the meaning, of figures. All the work given to the arithmetic class should be practical. It should be for the most part arithmetic dealing with the real affairs of life. It should be presented in as interesting a manner as possible, and the pupils should be required to direct their attention more to things and their relations and less to the figures used in the solution. Clear, logical and complete explanations of the method of solution of every problem worked should be given by the pupils.

It was at the urgent request of some of the leading teachers of Prince Edward Island that I compiled this little work. I have endeavored to give a great variety of problems, and also to have them as practical as possible. Those parts of arithmetic which have not been receiving due attention in our schools I have emphasized.

My thanks are due to Alexander Anderson, Esq., LL.D., Chief Superintendent of Education for P. E. Island, for many valuable suggestions given me while engaged at this work, also for his kindness in revising the complete manuscript, and assurances of his approval of the Problems for use in the public schools of Prince Edward Island.

G. J. McCORMAC.

CHARLOTTETOWN, P.E.I.,

January 2, 1902.



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## PRACTICAL PROBLEMS IN ARITHMETIC

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1. A swimmer takes 22 strokes a minute, and goes  $2\frac{1}{2}$  yards each stroke. How long does it take him to swim three-quarters of a mile?
2. The total area of three estates is 3,536 acres. If the areas of the two smaller estates be respectively three-fifths and two-thirds that of the largest, find the acreage of each.
3. When a person is 21 years old, what is his age in seconds?
4. What is the simple interest on 22 cents for 15 years at  $5\frac{1}{2}\%$ ?
5. Find the value of  $\frac{2}{5}$  of £5 7s. 11d. +  $\frac{4}{3}$  of £20 5s. 9 $\frac{1}{2}$ d. -  $\frac{1}{9}$  of £11 12s. 6d., and reduce the result to the decimal of a guinea.
6. How many demijohns, each containing 2 gals. 3 qts. 1 pt., can be filled from a tank holding 143 gals. 3 qts. of wine?
7. If a room is 20 feet long and 16 feet wide, how many square yards of plastering are there overhead? How many yards of carpet  $\frac{7}{8}$  yd. wide will cover the floor?

## 8 PRACTICAL PROBLEMS IN ARITHMETIC.

### 1. Simplify

$$1\frac{1}{4} - \frac{1 - \frac{7}{2}}{2 - \frac{4}{3}} + \frac{1\frac{2}{5}}{3\frac{1}{2}} - \frac{5\frac{3}{8}}{6\frac{1}{4}} \text{ of } \left( \frac{1}{5} - \frac{1}{4} - \frac{1}{3} - \frac{1}{6} \right).$$

2. A man failed in business, owing *A* \$1400, *B* \$4600, and *C* \$2000. The cash proceeds of his estate are \$5000. How much can he pay on the dollar, and what amount does *B* receive?

3. Find the area of a rhomboid whose length is 10.52 chains, and height 7.63 chains.

4. How many small cubes, a side of which is 4 inches, may be cut out of a large cube whose side is 8 inches?

5. What is the cost in Montreal of a sight draft on Halifax for \$2000 at a discount of  $\frac{1}{8}\%$ ?

6. Arrange in order of magnitude:

$$\frac{3}{4}; \frac{5}{6}; \frac{7}{9}; 2\frac{1}{5} \div 2\frac{2}{5}; 4\frac{1}{7} \text{ of } \frac{\frac{3}{4}}{1 + \frac{1}{1\frac{2}{5}}}.$$

7. If 10 sheep or 15 lambs can eat 40 bus. of turnips in 7 days, how long will it take 6 sheep and 18 lambs to eat 36 bus.?

8. Two settlers in Alberta own adjoining farms of 300 and 500 acres respectively. They unite their farms, taking at the same time an additional partner, who pays them \$1600, on the understanding that a third share of the land in future shall belong to each. How is the \$1600 to be divided between the original owners?

9. If the planet Mercury moves at the rate of 111000 miles an hour, how far would it move in a year?

10. Subtract .657 of 2 acres from 7.042 of 1 rood, and express the answer in square yards and the decimal of a square yard.

## PRACTICAL PROBLEMS IN ARITHMETIC. 9

1. How many children can be accommodated in a school-room 27 ft. wide, 36 ft. long, 9 ft. high, if 150 cu. ft. of air should be allowed for each child?
2. Of two watches, one loses 5 seconds and the other gains 4 seconds in 12 hours; they are both correct at noon on a certain day; when will one be 5 minutes before the other, and what time will each then show?
3. What percentage of the letters are vowels in the following sentence:—"Arithmetic is the science of numbers and the art of computing them"?
4. Divide .264 by .2; 1561.275 by 24.3; 3752.3 by 100000.
5. Find the Present Worth of \$500 for 19 months at  $5\frac{1}{2}\%$ .
6. How often must one go round a square field of 10 acres to run a mile?
7. Find the proceeds of a note for \$186 given for 3 months and discounted at the bank the day it was made at 6% per annum.
8. Simplify 
$$\frac{3.5 - 1.83}{9.7 - 6.4} \times \frac{1}{71} \div \frac{3.1 \times .101}{2.15}.$$
9. If £1 sterling be worth 45 Pauls 9 Baiocchi, and be worth  $25\frac{1}{2}$  francs; show that a Napoleon of 20 francs equals 36 Pauls (10 Baiocchi = 1 Paul).
10. Reduce 11 ro. 11 pr. 11 yds. to inches and find what fraction of 3 acres the result is.
11. If the price of bread be proportionate to the price of wheat, and a 10c. loaf weighs 14 oz. when wheat is worth 80c. a bushel, what is the weight of a 10c. loaf when wheat is worth \$1.12 a bushel?

## 10 PRACTICAL PROBLEMS IN ARITHMETIC.

1. *C* does half as much in a day as *A* and *B* can do together, and *B* does half as much again as *A*. If all three working together can mow 20 acres of barley in 16 days, how long would each working by himself take to mow 5 acres?
2. Divide 41.2666368 by .05888.
3. What is the square root of 15241578750190521?
4. Suppose a town levies a poll-tax of \$216.09, so that each man shall pay as many cents as there are of men to be taxed; what is each man's tax?
5. Write a number that may be classified as prime, odd, concrete, integral, simple, and denominative. Define each of those terms.
6. Find the cost of painting the walls of a room 20 ft. long,  $14\frac{1}{2}$  ft. wide, and 10 ft. 4 in. high, at  $13\frac{1}{2}$ c. per sq. yd., allowing for a fireplace 4 ft. by 4 ft. 4 in. and two windows each 6 ft. by  $3\frac{1}{6}$  ft.
7. Express  $\frac{3}{40}$  of 12s. 6d. +  $\frac{4}{15}$  of 3 guineas +  $\frac{5}{12}$  of £4 -  $\frac{3}{70}$  of 2 $\frac{1}{2}$ d. as the fraction of £5.
8. If a tract of land  $6\frac{1}{4}$  miles long and 4 miles wide, which cost \$1.25 an acre, be exchanged for the same quantity in the form of a square, and subsequently be divided into 100 equal and square farms,  $\frac{3}{4}$  of which should bring at sale \$11.75 per acre,  $\frac{2}{5}$  of them \$12 an acre, and the remainder \$10 $\frac{1}{2}$  per acre; what would be the profit in the transaction, and what the sum of the distances round all the squares?
9. Of how many variations will the 26 letters of the alphabet admit?
10. Two ships sail from the same port; one goes due north 40 leagues, the other due east 90 miles. How far are they then apart?

## PRACTICAL PROBLEMS IN ARITHMETIC. 11

1. A Summerside merchant marks an article 40 % above cost; he sells it on account at a discount of 10 % on the market price; he pays 20 % of the debt for collecting it. What per cent does he gain or lose?
2. A sold  $\frac{3}{4}$  of a piece of land for what  $\frac{3}{4}$  of it cost him? What was the gain per cent?
3. Simplify  $2_{3000} + 1_{1000} + 5_{6000} + 2.000875$ .
4. Find the area of a square whose side is 35.25 chains.
5. A cow is fastened to a stake by a rope 12 feet long. What space can she graze over?
6. Express 18s. 4 $\frac{1}{2}$ d. as a decimal of £1000.
7. The interest on \$870 for a certain time at 6% per annum is \$124.41. Find the time.
8. The discount on \$566.50 for 9 months is \$16.50. Find the rate of interest.
9. What is the value of .25 of  $\frac{1}{4}$  of  $\frac{\frac{2}{3} + \frac{1}{2}}{\frac{3}{2} - \frac{1}{3}}$  of 8 guineas.
10. The width of a room is twice its height and one half its length, and the contents are 4096 cu. ft. Find the dimensions of the room.
11. How many pounds of water will fill a tank 11 ft. 8 in. by 3 ft. 6 in. by 2 ft. 3 in., if the weight of a cubic foot of water be 1000 oz?
12. The price of a certain lot of goods is \$80. If I buy at 10 % off and sell at 25 % on, what per cent do I gain?
13. A rectangular field, 300 yd. long and 150 yd. wide, is separated into four equal parts by two bands of trees 20 ft. wide parallel to the sides. How large will each part be, and what will be the area covered by the trees?

## 12 PRACTICAL PROBLEMS IN ARITHMETIC.

1. A window in a burning building is 45 feet high. How long must a ladder be to reach the window from the opposite side of the street, the street being 60 ft. wide?
2. Express by Roman notation (a) 1050, (b) 1793.
3. A and B travelled on the same road in the same direction—A at the rate of  $3\frac{3}{4}$  miles per hour, and B at the rate of  $5\frac{1}{2}$  miles per hour. If A has  $13\frac{3}{4}$  miles the start, in how many hours will he be overtaken by B?
4. If I buy a house for \$2910, how large a note at six months must I have discounted, at 6 %, to pay for it?
5. How many acres are there in a circle whose circumference is one mile?
6. A rectangular courtyard is 42 ft. 9 in. long and 68 ft. 6 in. wide, a footpath goes quite through it, and is 5 ft. 6 in. in width; the footpath is laid with stone at 3s. 6d. per yard, and the rest with pebbles at 3s. per yard. What will the whole cost?
7. The width of a plank is 26 inches; what must be the length of the part cut off, so that it may contain 1 yd. 4 ft. 72 in. superficial measure?
8. What must be the face value of a 30-day draft on Charlottetown, purchased in Toronto at a premium of  $1\frac{1}{4}$  % to cost \$3625.20, interest 6 %?
9. Find the sum of  $£3\frac{4}{9}\frac{3}{8}$  and  $(9\frac{1}{2} - 2\frac{7}{8})$  of 5s. and multiply the result by  $\frac{3\frac{1}{5} - 4\frac{3}{20} + 2\frac{1}{2}}{3\frac{1}{25} - \frac{1}{10}} \times \frac{3\frac{2}{5}}{\frac{3}{8} + \frac{3}{8} - \frac{5}{16}}$ .
10. If 11 horses and 13 cows consume 15 tons of hay in 45 days, how many tons will 17 horses and 23 cows consume in 60 days, if 2 horses eat, on an average, as much as 3 cows?

## PRACTICAL PROBLEMS IN ARITHMETIC. 13

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1. The distance round each of two gardens is 25 rods; one is in the form of a circle, the other a square. Which contains the more land, and how much?

2. Express the following numbers in Arabic notation: CCCCCXC, DCCLXXXIX. Explain both systems of notation.

3. Simplify:

$$\left\{ \frac{(0.00185)^3 \times 3\frac{7}{8} - 4\frac{1}{3} + 2\frac{1}{2}}{(18.5)^3 \times 9\frac{1}{3} - 7\frac{1}{2}} \right\}^3 \times 1100000000.$$

$$\frac{2+2}{3} \div .000039$$

$$3+2$$

$$3+\frac{3}{2}$$

4. A merchant marks the selling price of an article which sells at \$3.25, ALK, one which sells at \$9.60 as TSH, one which sells at 17c. as BM, and one which sells at 84c. as IC. What is his private mark, and what was the total cost to him of the four articles if the first article is sold at a gain of 30% on cost, the second and fourth at a gain of 20%, and the third at a gain of 13½%?

5. There is a house having three rows of windows and three windows in each row; the width of each window is 3 ft. 11 in. Find the cost of glazing the windows at 24c. per sq. ft., supposing the length of a window in the first row to be 7 ft. 10 in., in the second row 6 ft. 8 in., and in the third row 5 ft. 4 in.

6. Find the contents of a rectangular board whose length is  $12\frac{1}{2}$  ft. and width 9 in.

7. A owes a sum equal to  $\frac{3}{4}$  of his yearly income. By saving  $\frac{6}{19}$  of his income annually for five years he can pay his debt and have \$1260 *left*. What is his yearly income?

## 14 PRACTICAL PROBLEMS IN ARITHMETIC.

1. *A* bought a horse, which he sold to *B* at a loss of  $6\frac{1}{2}\%$ ; *B* sold him to *C* at a loss of  $5\frac{1}{2}\%$ ; *C* sold him at a gain of  $12\frac{1}{2}\%$ . How much did *A* lose if *C* gained \$26.79?
2. Find the difference between a direct discount of 20 per cent and discounts of 15 per cent and 5 per cent.
3. Write a negotiable note and define it.
4. An agent received \$1132.41 to invest in cotton at 24c. a lb., deducting  $3\frac{1}{2}\%$  commission. How many pounds did he buy?
5. Suppose Mr. A. Campbell bought of Beer & Goff, Charlottetown, during the month of March the following goods: 100 lbs. of sugar at the rate of 16 lbs. for \$1.00, 20 lbs. of coffee at the rate of 5 lbs. for \$1.00, \$2 worth of tea at 40c. a lb. Make out a receipted bill for the goods, dated April 1st, 1902.
6. A dealer mixed sugar which cost 11c., 9c., and 13c. per pound respectively in equal quantities, and sold the mixture so as to gain 20 per cent. At what price per pound does he sell it?
7. The product of four numbers is 932.25; three of them are 56.5, 1.1, and .63. What is the fourth?
8. Find the amount of duty a Moncton tobacconist must pay on 30 kegs, each weighing 28 lbs., tare 5%, which cost in Carolina 18c. a lb., if the duty is 45c. per lb. and  $12\frac{1}{2}\%$  *ad valorem*.
9. The interest on \$456 for 3 yrs. 5 mos. 18 dys. is \$79.04. What is the rate?
10. *A* and *B* can do a piece of work in 40 hours, and *B* can do it alone in 60 hours. In how many hours can *A* alone do it?

## PRACTICAL PROBLEMS IN ARITHMETIC. 15

1. Find the difference between the true discount and the bank discount of \$1000 for 1 yr. 3 mos. 15 dys. at 7%.

2. The length of a parallelopiped is 9 ft., bre. h 2 ft., and depth 18 in. Find its solidity.

3. Find the legal time of maturity of the following note, the unexpired time and the proceeds, it being discounted April 10th, 1901, at 6%:

\$175.50      Georgetown, P.E.I., March 15th, 1901.

Ninety days after date, for value received, I promise to pay to Howard Leslie, or order, One hundred seventy-five  $\frac{5}{100}$  dollars, at the Merchants' Bank of P. E. Island, Souris, with interest.

Parmenas McLeod.

4. In an Arithmetic an example was printed thus:

"Add together  $\frac{1}{143}, \frac{1}{194}, \frac{1}{134}$ ," the denominator of one fraction being accidentally omitted. The answer given at the end of the book was  $\frac{1}{2}$ . Find the missing denominator.

5. *A*, *B*, and *C* start in business together; *A* puts in \$5000, *B* \$6000, and *C* \$9000. At the end of three months *C* leaves, and at the end of seven months *B* leaves, both taking out their capital with them; but the profits are not divided till the end of the year, when *C* receives \$50. How much will *A*, *B*, and *C* then receive?

6. Reduce  $\left\{ \frac{23}{43} \div \frac{34}{44} \right\} \times \frac{5}{9} + .01$  to a decimal.

7. Find the value in Canadian money of a purse containing 30 sovereigns, 15 half-sovereigns, 13 crowns, 36 half-crowns, a guinea, and a shilling.

## 16 PRACTICAL PROBLEMS IN ARITHMETIC.

1. What number plus 30 % of itself equals 162.5 ?
2. A firm sold \$45000 worth of goods in a year;  $\frac{2}{5}$  of the receipts were sales at 20 % profit,  $\frac{1}{2}$  at 25 % profit, and the remainder at 33 $\frac{1}{3}$  % profit. What was the total cost ?
3. How long will it take \$4000 to gain \$625 interest at 5 $\frac{1}{2}$  % ?
4. Bought goods as follows: March 1st, 1901, \$200 on 2 mos.; April 6th, \$800 on 4 mos.; June 17th, \$1000 on 3 mos. What is the average time and date of payment ?
5. If a child should receive 1 cent at birth, 2 cents on the second birthday, 4 cents on the third, etc., how much would he be worth when 21 years of age ?
6. If a rhomboid be 80 ft. long and 60 ft. wide, what is the sum of the area of the two ends which, when cut off, will leave the remainder in the form of a square ?
7. The population of Borneo at the beginning of 1901 was 175,000. If the death-rate during the year 1901 was 112 in the thousand and the birth-rate 17 % more than the death-rate, what was the population at the end of 1901 ?
8. Find the difference between a garden containing 6 square rods and one which is 6 rods square.
9. How much must I invest in Dominion bonds at 142, brokerage  $\frac{1}{8}$  %, to secure an income of \$1600, if the stock pays a dividend of 10 % ?
10. Being at sea, I saw the flash of a cannon, and counted 8 seconds between the flash and the report. Required the distance.

## PRACTICAL PROBLEMS IN ARITHMETIC. 17

1. Simplify 
$$\left\{ \left( \frac{6\frac{3}{7} \text{ of } \frac{5\frac{1}{6} - 4\frac{7}{12}}{12\frac{2}{3} - 7\frac{5}{2}} \right) \div \frac{1 + \frac{1}{2\frac{1}{3}}}{2} \right\}$$
  

$$\left\{ \frac{5\frac{5}{6} \div \frac{3}{2}}{1\frac{1}{5} \text{ of } \frac{5}{6} \div 10\frac{1}{3}} \times \frac{\frac{2}{5} \text{ of } \frac{11}{12} \text{ of } 4\frac{1}{9}}{13\frac{7}{8} \text{ of } 5\frac{1}{3}} \right\}$$
  

$$\times \left\{ \frac{3.5 - 1.83}{9.7 - 6.4} \times \frac{1}{71} \div \frac{3.1 \times .101}{2.15} \right\}$$

2. Find the value of 500 times the difference between an eighty-fourth part of  $2\frac{1}{2}$  cwt. and a thirtieth part of 1 cwt. 3 lbs. (28 lbs. to qr.).

3. A gentleman, wishing to erect a marble chimney-piece in his drawing-room, applied to a mason, who gave in the following estimates:—

Length of mantel and slab .. each 4 ft. 8 in.  
 Sum of their breadths .. .. .. 3 ft. 4 in.  
 Length of each jamb .. .. .. 4 ft. 6 in.  
 Sum of their breadths .. .. .. 1 ft. 10 in.

Find the superficial contents of the marble required to complete the job, and determine the value thereof at \$1.26 per sq. ft.

4. A plot of land is valued at £1936 per acre. What is its value in francs per square metre if £1 =  $25\frac{1}{7}$  fr. and a metre =  $39\frac{3}{8}$  in.?

5. Find the square root of (a) 4160580062500, (b) 5.774409, (c)  $153\frac{7}{9}$ , (d) 14356521.

6. A person, after paying an income tax of 6 mills in the dollar, has \$1590.40 income. What was his gross income?

7. How many times will a wheel which is 15 ft. 9 in. in circumference turn round in going from Charlottetown to Cardigan, it being 24 miles?

## 18 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Find the value of .7 of £1 + .8 of 7s. 6d. - 2.45 of 1s. 8d.
2. A teacher, being asked how many scholars he had replied, "If I had as many more as I now have, one-half as many more, one-third as many more, and one-fourth as many more, I should have 296." How many had he?
3. A grocer mixes tea worth 38c. and 44c. respectively. What must be the selling price of the mixture that he may gain 15 % on the outlay?
4. How many yards of paper, 30 in. wide, will be required to cover the walls of a room 15 ft. long by 2 ft. wide and 8 ft. high? What will it cost to plaster the walls and ceiling at 10c. per sq. yd.?
5. A broken tree rested on the stump 20 ft. from the ground, and its top touched the ground 50 feet from the stump. How high was the tree?
6. A garrison of 960 men had provisions for 37 days at the rate of three rations daily; at the end of 12 days they were reinforced by 240 men. How long would the remaining provisions last at the rate of  $2\frac{1}{2}$  rations daily?
7. Find the vulgar fraction which is equal to the sum of 15.3125 and 12.0075 divided by their difference.
8. If 25 men, by working 10 hrs. a day, can dig a trench 36 ft. long, 12 ft. wide, and 5 ft. deep in 9 days, how many hours a day must 15 men work in order to dig a trench 48 ft. long, 8 ft. wide, and 3 ft. deep in 12 days?
9. The Austrian National Debt amounts to 2306236856 florins. Express its amount in words, reduce its value to our currency (1 florin = 1s. 8d.; £1 = 4.8c $\frac{2}{3}$ ), and find how many days it would take to count at the rate of 96 florins a minute, working 10 hours a day.

## PRACTICAL PROBLEMS IN ARITHMETIC. 19

1. If a pile of wood in the form of a cube, sold at \$7.50 per cord, comes to \$3750, what must be the length of the pile?
2. A watch which gains 5 seconds in every 3 minutes was set right at 6 a.m. What was the true time in the afternoon of the same day when the watch indicated a quarter past 3 o'clock?
3. Find the cost of tiling a roof of a building whose length is 30 ft. and width 8 yds.; the eaves being supposed to project 1 ft. on each side, and the roof of such a nature as to form a right-angle at the top; reckoning at \$4.70 per 100 sq. ft.
4. In a train containing 240 passengers, the number of first and third class passengers was 202, that of second and third class 138. How many passengers were there in each class?
5. A merchant whose cost-mark is "Cumberland," has the cost price marked on an article as BLE. At what per cent advance must be the selling price that he may give a discount of 20% from the asking price, and still make 20% on the cost?
6. Find the value of 5 oaken planks at 6c. per ft., each being  $17\frac{1}{2}$  ft. long, and their widths as follows: two of  $13\frac{1}{2}$  in., one of  $14\frac{1}{2}$  in., and the remaining two of 18 in. at one end and  $11\frac{1}{4}$  in. at the other.
7. Simplify:  
$$\frac{\frac{5}{14} - \frac{3}{7} \text{ of } \frac{1}{2}}{\frac{5}{16} + \frac{7}{12} \text{ of } 3\frac{1}{4} - \left( \frac{7}{8} \text{ of } \frac{3}{2}\frac{1}{4} - \frac{1}{3} \right)} \div \frac{\frac{1}{3} \text{ of } \frac{1}{2} + \frac{3}{2} \text{ of } 5}{9\frac{1}{3} - 1\frac{1}{3}}.$$
8. Suppose I remit to my agent at Halifax \$1500 for the purchase of flour. The flour costs him \$5.00 a barrel, and his commission is  $2\frac{1}{2}\%$ . How many barrels of flour shall I receive after deducting his commission?

## 20 PRACTICAL PROBLEMS IN ARITHMETIC.

1. From a pile of wood 24 ft. long, 4 ft. wide, and 5 ft. high, there were sold  $1\frac{1}{2}$  cords at one time and half a cord at another time. What is the remainder worth at \$3.25 a cord?
2. Find the distance round a lot of land in the form of a right-angled triangle, if the longest side is 200 rods and the shortest 120 rods.
3. A cellar is to be dug whose length, breadth, and depth are each 12 ft. 3 in.; find the number of solid feet in it.
4. The capital stock of a railway is \$1437500, and its debt is \$37500. Its gross earnings for the year 1901 were \$250000, and its expenses \$132500. If the company paid expenses and interest on its debt at 6 %, and reserved \$250 as surplus, what dividend would a stockholder receive who owned 25 shares, par value \$100?
5. If the population is now ten millions and the births are 1 in 20 and the deaths 1 in 30, annually, what will the population be in 5 years?
6. Having observed the flash of a cannon, I noticed by my watch that 6 seconds elapsed previous to my hearing the report. Determine my distance from the gun.
7. A detachment, consisting of 5 companies, was sent into a garrison, in which the duty required 228 men per day. The first company consisted of 162 men; the second, 153; the third, 144; the fourth, 117; and the fifth, 108. How many men must each company furnish in proportion to the whole number of men?
8. Find the value of  $\frac{2}{3} \times \frac{5}{7} \times \frac{3}{5}$  and  $\frac{1}{7} \times \frac{2}{3} \times \frac{8}{5}$ , and take the result from  $10\frac{3}{4} + 3\frac{2}{10} + 7\frac{2}{25}$ .

## PRACTICAL PROBLEMS IN ARITHMETIC. 21

1. How many acres are there on the surface of the earth, if it contains 197000000 square miles? Express the answer in words.
2. A gentleman in Georgetown has two building lots, one containing 40 sq. rds. and the other 60; a gentleman in Montague offers him a square field containing four times as much land as his lots. How many rods in length must each side of the square be?
3. Multiply  $3\frac{1}{5}$  by  $3\frac{1}{10}$  and divide  $\frac{20\frac{2}{3}}{3}$  by  $4\frac{1}{4}$ , and find the difference between the sum and difference of these results.
4. What is the difference between .77777 of £1 and 8s. 6.6648d.?
5. *A*, *B*, *C*, and *D* enter into partnership. *A* and *B* put in \$1390; *B* and *C*, \$1590; *C* and *D*, \$1810; *A* and *D*, \$1610; *A* and *C*, \$1500. They gain \$1152. What is the gain of each?
6. A man built a house of three stories. In the upper story there were 10 windows, each containing 12 panes of glass, each pane 14 in. by 12 in.; the first and second stories contained 14 windows, each of 15 panes, and each pane 16 in. by 12 in. How many sq. ft. of glass were there in the house?
7. Find the cube root of 8096384512000000000.
8. If *B* is 10 years older than *A*, and *C* is as old as both *A* and *B*, what are their several ages, the sum of them all being 100?
9. On January 1st, *A* began to trade with \$760; on the 1st of February following he took in *B* with \$540; on June 1st following he took in *C* with \$800; at the end of the year they found they had gained \$782. What was each man's share of the gain?

## 22 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Simplify  $\left\{ \frac{\frac{1}{3} + \frac{3}{10}}{6\frac{1}{3}} + \frac{5\frac{1}{2}}{4\frac{1}{9}} \right\} \div \left\{ 11 \times \frac{8\frac{1}{2}}{15\frac{2}{5}} \right\}.$
2. *A*, standing on the left bank of Hillsborough River, discharges a gun, and *B*, on the opposite bank counts five pulsations of his wrist between the flash and the report. If sound flies 1142 feet per second, and the pulse of a person in health beats 75 strokes in a minute what is the width of the river?
3. If the unit of measurement be  $2\frac{1}{2}$  yds., what is the measure of  $2\frac{1}{2}$  ft.?
4. Find the value of .02 of £1 + .03 of 7s. 6d. + .014 of 2s. 9d.
5. If a pile of wood which is 256 ft. long, 40 ft. wide, and 40 ft. high, be thrown into the form of a cube and sold for  $\frac{3}{5}$  of as many dollars as the cube would be feet long, what sum would the cube bring?
6. A piece of work is to be done in 36 days; 15 men work at it 15 hours a day, but after 24 days only  $\frac{3}{5}$  of it is done. If three more men are put on, how many hours a day must all work to finish it in the given time?
7. The bank discount on a note discounted 2 months 12 days before it was due, at 6 % per year, was \$234. Find the face of the note.
8. Find the cost of covering the floor of a hall  $46\frac{1}{2}$  ft. long and 14 ft. 9 in. wide, with matting  $1\frac{1}{4}$  yds. wide, at 25c. a yard.
9. I sold two houses at \$2844 each. On one I gained 8 %, and on the other lost 8 %. What did I gain or lose?

## PRACTICAL PROBLEMS IN ARITHMETIC. 23

1. There are three towers, A, B, and C, standing in a direct line, the heights of which are 64, 90, and 50 ft. respectively. The distance between the top of tower A and that of B is 97 ft., and the distance between the bottom of the tower B and that of C is 76 ft. From these data find the following distances: (a) From the top of A to the bottom of B; (b) from the top of B to the bottom of A; (c) from the bottom of A to the bottom of B; (d) from the bottom of B to the top of C; (e) from the bottom of C to the top of B; and (f) from the top of B to the top of C.
2. Sold 1280 bus. wheat at \$1 $\frac{1}{2}$ ; commission 3 $\frac{1}{2}\%$ , charges \$51.42 $\frac{1}{4}$ . Invested proceeds in iron, commission 2 $\frac{1}{2}\%$ . Find the sum invested in iron.
3. The solid contents of a cube are 1728 cu. ft.; (a) find the length of the edge; (b) find the surface of all its faces; (c) find the length of the diagonal across one face.
4. If  $\frac{5}{8}$  of the price received for an article is lost, what is the loss per cent?
5. If a pole 12 $\frac{1}{2}$  ft. long cast a shadow 9 $\frac{3}{4}$  ft. long, how long must a pole be to cast a shadow 21 ft. long at the same hour of the day?
6. Subtract  $15\frac{1}{3}\frac{9}{4}$  from  $17\frac{1}{5}\frac{1}{3}$ ; multiply together  $3\frac{7}{11}$ ,  $1\frac{2}{6}\frac{7}{8}$ ,  $2\frac{4}{5}\frac{6}{5}$ , and  $1\frac{7}{7}\frac{7}{1}$ ; divide  $33\frac{3}{2}\frac{3}{5}$  by  $2\frac{1}{2}\frac{9}{6}\frac{3}{5}$ , and subtract the first two results from the last.
7. If the military defensive strength of the British Empire is two million men, what percentage of the area of P. E. Island would give them standing room, each man occupying 9 sq. ft.?

## 24 PRACTICAL PROBLEMS IN ARITHMETIC.

1. *A* works for 6 days at the rate of 8 hours per day. *B* works for 5 hours on the first day, and on each of the five subsequent days an hour longer than on the preceding day; *A* does as much in 4 hours as *B* does in 5 hours. If the sum total paid *A* and *B* as wages for the week be \$14, how much should each receive?
2. How many square yards are there in a rhomboid whose length is 37 ft. and breadth 5 ft. 3 in.?
3. The height of a precipice, standing by the side of a river, is 103 ft., and a line of 320 ft. will reach from the top of it to the opposite bank. Find the width of the river.
4. What will be the cost of a lead covering for the roof of a cathedral, supposing the length of the roof to be 210 ft. and its width 80 ft.; also the guttering 4 ft. wide, of the same length as the roof, and to contain 8 lbs. to the sq. ft., the roof containing only at the rate of 8 lbs. to the sq. ft., the cost of both roofing and guttering being \$4.80 per cwt.?
5. The Dr. side of a merchandise account is \$25000 Cr. side is \$14784; inventory is \$12400. Find the per cent. gain or loss on sales.
6. I bought goods in Montreal, costing \$862; freight etc., adds 6% to the first cost. At what price must the goods be sold to gain 22% on the full cost?
7. The distance from the top of a post 6 ft. high, standing in a yard, to the top of a building on one side is 150 ft.; to the top of a building on the other side is 140 ft.; the first building is 120 ft. high and the second 100 ft. What is the width of the yard?

## PRACTICAL PROBLEMS IN ARITHMETIC. 25

1. Simplify  $\frac{1}{4}$  of  $\frac{2}{3}$  of  $\frac{13}{16}$  -  $\frac{13}{63}$  of  $\frac{1}{16}$  +  $\frac{3}{7}$  of  $\frac{6\frac{1}{2}}{3\frac{2}{3}}$ .
2. A miller has a bin 8 ft. long,  $4\frac{1}{2}$  ft. wide,  $2\frac{1}{2}$  ft. deep, holding 75 bushels. How deep must he make another bin, which is 18 ft. long and  $3\frac{5}{8}$  ft. wide, to hold 450 bushels?
3. If a piece of land, 60 rods in length, be 20 rods wide at one end and at the other terminates in an angle, what number of square rods does it contain?
4. A dealer bought a quantity of lumber for \$700. At what price must he sell it so that he may discount 20% on asking price, allow 10% of sales to be bad, pay 2½% commission for selling, and still make a profit of 40% on cost?
5. Find the contents of a wall which is 62 ft. 6 in. long and 14 ft. 8 in. high, the thickness being  $2\frac{1}{2}$  bricks.
6. A farmer borrowed from his neighbor part of a hay-rick, the part measuring 6 ft. in length, breadth and thickness. At the next hay-season, he paid back two equal cubical pieces, each side of which was 4 ft. Has the debt been discharged?
7. If 6 compositors in 16 days of  $10\frac{1}{2}$  hrs. each can set in type 720 pages, each of 60 lines, with 40 letters in a line; in how many days of 7 hrs. each will 9 compositors set 960 pages, each of 45 lines, with 50 letters in a line?
8. A bottle filled with pure wine contains 16 drinks or parts of a certain measure. If I take  $\frac{1}{16}$  out of this and fill the bottle with water, then take another  $\frac{1}{16}$  out of the mixture of wine and water, and fill the bottle again with water, and so on until I have taken 16 drinks out of it, how much wine does the last or 16th drink contain?

## 26 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Simplify: 
$$\left( 2\frac{1}{5} - \frac{1}{6} \text{ of } \frac{1}{1 + \frac{1}{3 + \frac{1}{8}}} \text{ of } \frac{9\frac{1}{4}}{12\frac{1}{11}} \div 2\frac{1}{5} \right) \times \left( 3 + \frac{1\frac{1}{2} + 1\frac{1}{2}}{2\frac{1}{15} - 1\frac{1}{20}} \text{ of } 4\frac{1}{2} \text{ of } 3\frac{3}{7} \right).$$

2. The length of a room is treble its width; the cost of flooring, at 7s. 6d. per sq. yd., is £28 2s. 6d., and that of painting the four walls, at 4½d. per sq. ft., is also £28 2s. 6d. What is the height of the room?

3. If the first term of an arithmetical progression be 3, the common difference 2, and the number of terms 12, what is the last term?

4. There is a triangular cornfield whose three sides are 150, 200, and 250 yds. respectively. Find the cost of reaping the corn at \$2.42 per acre.

5. A grocer bought sugar amounting to \$725 on 90 days' time, but being offered 4% off for cash borrowed the money at a bank for the time, less grace at 9%, and cashed the bill. What was the face of the note?

6. 25 per cent. of 2 is what per cent. of  $33\frac{1}{3}$  per cent. of 6?

7. A ladder, 40 ft. long, may be so placed that it shall reach a window 33 ft. from the ground on one side of the street; and by only turning it over without moving the foot out of its place, it will do the same by a window 21 ft. high on the other side. What is the width of the street?

8. The cost of carpeting a room 18 ft. long by 16 ft. wide, with carpet worth \$1.20 a yard, is \$51.20. How wide is the carpet?

## PRACTICAL PROBLEMS IN ARITHMETIC. 27

1. Bought 960 acres of land for \$12000; sold one-fifth of it at \$12 an acre, one-third of it at \$15 an acre, and the remainder for \$20 an acre. Did I gain or lose, and how much?
2. What must be the rate of wages, that 12 men may earn in 10 days the same amount that 9 men earn in 14 days, at \$1.50 per day?
3. Make an original problem for carpeting the floor of a room, or for plastering or papering the walls and ceiling of a room, and give the solution in full.
4. The diagonal of a square field is 120 rods. Find the area in acres.
5. Reduce .48 of a sq. rod to the decimal of an acre.
6. If 15 quarts of milk will make 2 lbs. of butter, and 6 lbs. of butter require as much milk as 30 lbs. of cheese, and 40 lbs. of cheese be made from 2 cows in 3 days, how many quarts of milk, at that rate, would 25 cows give in 6 months? If the milk sell at 5c. a quart, the butter at 25c. a lb., and cheese at 10c. a lb., which would be the more profitable, for the given time—the selling of milk, the making of butter, or the making of cheese?
7. *A* and *B* together can do a piece of work in 12 days. If *A* can do only  $\frac{3}{4}$  as much as *B*, how long will it take each of them to do the work?
8. Find the area of a triangle whose base is  $18\frac{1}{2}$  yds. in length and its perpendicular altitude  $15\frac{1}{4}$  yds.
9. Simplify: 
$$\left[ \frac{31\frac{1}{4} - 22\frac{1}{5}}{11\frac{1}{5} - 1\frac{1}{7}} \div 14\frac{2}{8} + 2\frac{5}{12} \right] \div \left[ \frac{10\frac{1}{5}\frac{6}{1} - (4\frac{3}{7} + 3\frac{2}{3})}{4\frac{9}{12}\frac{1}{2} \times (4\frac{1}{8} \text{ of } 6\frac{2}{7} + 1\frac{3}{14}) \div (4\frac{1}{8} \text{ of } (6\frac{2}{7} + 1\frac{3}{14}))} \right]$$

## 28 PRACTICAL PROBLEMS IN ARITHMETIC.

1. The population of a certain town, according to census of 1891, was 5310, an increase of 18% over census of 1881, and the census of 1881 showed a gain 25% over the population of 1871. What was population according to the census of 1871?
2. There are 57 boxes of rice, each containing eight hundred and nine thousand three hundred and nine grains, and 76 other boxes, each containing seven hundred and nineteen thousand two hundred and nine four grains. Write in words how many grains of rice there are altogether.
3. Sailing into Charlottetown harbor, I saw the flash of a cannon, and counted 8 seconds by my watch between the flash and report. Find my distance from Fort Edward.
4. A cable which is 3 ft. long and 9 in. in circumference weighs 22 lbs. Determine the weight of a cable whose diameter is 9 in. and length 1 fathom.
5. Feb'y 28th, 1901, I bought a bill of goods amounting to \$686.40 on the following terms: "3 months no or less 5% if paid in 15 days." How much will be required to settle the bill March 14th?
6. What must be the face of a note, so that when discounted at bank at 7% for 9 months the proceeds will be \$500?
7. The base and hypotenuse of a right-angled triangle are respectively 7.6 in. and 9.5 in. Find the perpendicular.
8. A traveller, on reaching a certain place, found that his watch, which kept correct time for the place he left, was 2 hrs. 25 min. slower than the local time. Had he travelled eastward or westward, and how far?

## PRACTICAL PROBLEMS IN ARITHMETIC. 29

1. A merchant increased his capital the first year by one-quarter of itself, the second year by two-fifths, the third year he lost two-sevenths of all he had, and had \$15000 remaining. What was his capital at first?
2. The diameters of two concentric circles are 15 and 16 ft. Find the area of the ring formed by these circles.
3. Find the cost of painting the four sides and the bottom of a tank  $2\frac{1}{2}$  yds. long, 4 ft. wide, and  $4\frac{1}{2}$  ft. deep, at 8c. per sq. ft.
4. If the number of square miles in the British Empire be 13000000 and the population 450000000, how many persons are there to the square mile?
5. If 5 horses eat as much as 6 cattle, and 8 horses and 12 cattle eat 12 tons of hay in 40 days, how much hay will be required to keep 7 horses and 15 cattle 65 days?
6. Reduce .15309375 tons to cwt., lbs., oz.
7. A merchant bought tea at 18c. a lb., and marked it for sale at 25c.; but afterwards marked it up  $2\frac{1}{2}$  on asking price, at which price he sold 100 chests averaging 70 lbs. each. The purchaser having failed before payment was made, a compromise was effected at 78c. on the dollar. Did the seller gain or lose, and how much?
8. The length of a piece of timber is  $20\frac{1}{3}$  ft., the width at the greater end 1 ft. 9 in. and the thickness 1 ft. 3 in.; at the lesser end the width is 1 ft. 6 in. and the thickness 1 ft. What is the solidity?
9. A square mile has been added to the British Empire every 8 minutes of Queen Victoria's reign. If her reign dates from 5 a.m., June 20th, 1837, to 5 a.m., January 22nd, 1901, find the amount of territory added to the Empire during her reign.

## 30 PRACTICAL PROBLEMS IN ARITHMETIC.

1. In a city of 57840 inhabitants,  $\frac{1}{125}$  of the population are children attending the public schools. Find how many scholars attend the public schools.
2. Simplify :  

$$17\frac{1}{2} \times \{6 - 2 \div (\frac{1}{2} + \frac{1}{3})\} - 17\frac{1}{2} \div \{6 - 3 \times (\frac{1}{2} + \frac{1}{3})\}.$$
3. *A*, who had a horse for sale, would have lost 4% if he had accepted an offer made by *B*; but by selling it to *C* for \$318, he made a profit of 6%. What did *B* bid for the horse?
4. Convert £368 into dollars and cents.
5. Find the compound interest on \$6250 for 3 yrs. at 4%.
6. Find the area of a trapezoid, whose two parallel sides are 75 and 122 links, and the perpendicular distance 154 links.
7. There is a building whose side wall is 45 ft. long on the outside, and end wall 15 ft. long on the inside; the height of the building is 20 ft., and the gable at each end of the wall is 6 ft. high. What is the true content of the whole in rods, the wall being uniformly two bricks thick?
8. What percentage of the distance between Souris and Summerside by P. E. I. Railway is the distance between Mount Stewart and Souris?
9. Bought a house and lot for \$6000. For what must I rent it to gain 6% on my money, and to pay \$25.25 for repairs, \$22.50 for insurance, and taxes at  $1\frac{1}{4}\%$  on  $\frac{3}{4}$  of the value?
10. A rectangular flat roof is 24 ft 8 in. by 14 ft. 6 in. What will be the cost of covering it with lead at 28 shillings per long ewt., if the thickness of the lead be such as to weigh 8 lbs. to the sq. ft.?

## PRACTICAL PROBLEMS IN ARITHMETIC. 31

1. What number is that which being increased by  $\frac{3}{4}$  of itself and then doubled, gives 4 more than the square root of 2704?
2. Simplify:  $0.5 \times 1.714285 \times 1.0769230 \times .3$   
 $.6 \times 2.857142 \times 2.307692 \times 14.5$
3. What sum bears the same proportion to £5 that 13s. 11 $\frac{1}{4}$ d. does to £3 14s. 4d.?
4. A certain partition is 141 ft. 6 in. long and 11 ft. 3 in. high. How many sq. yds. does it contain?
5. A woodman hewing timber struck so vigorously that I heard each stroke of his axe, and counted 5 beats of my pulse between each stroke. How far was the woodman distant from me, reckoning 6 pulsations to elapse during the time that sound takes in moving a mile?
6. What is the difference between a field 60 rods square and one containing 60 sq. rods?
7. A agreed to labor for \$2.50 per day on condition that he should forfeit 50c. for every day he was idle. At the end of 100 days he received \$190. How many days was he idle?
8. What is the length of a rope extending from the top of a pole 40 ft. high to the top of a stake 13 ft. high, standing 35 ft. from the pole?
9. A cistern that holds 280 gallons is empty. It has a supply pipe that will fill it in 10 hrs. and a discharge pipe that will empty it in 7 hrs. If, after the supply pipe has been open 4 hrs., the discharge pipe is opened, in what time will the cistern be emptied?

## 32 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Multiply 16 by sixteen hundredths, divide the product by sixteen ten-thousandths and express the quotient in Roman notation.
2. Find the square root of the third power of 1.6 correct to 4 decimal places.
3. A square lot is bordered by a walk 1 yd. wide; the lot and walk together occupy  $2\frac{1}{2}$  acres. Find the cost of paving the walk at 25c. a sq. yd.
4. Write in figures: Eight hundred trillion, eight billion, eight million, eight hundred thousand and eighty.
5. A receives a semi-annual income of \$180 from C.P.R. stock at 6 %. What was his total investment if C.P.R. stock is quoted at  $110\frac{1}{2}$ , brokerage  $\frac{1}{4}$  of 1 per cent.?
6. King Edward VII. was born on November 9th, 1841. Find his age in minutes on November 9th, 1901.
7. Divide 6 dys. 5 hrs. 10 min. 30 sec. by 15, and multiply the result by  $11\frac{1}{2}$ .
8. Sold goods at a gain of 20 %. If the cost had been \$60 less, the gain would have been 25 %. Find the cost of the goods.
9. A brewery is worth 4 % less than a tannery, and the tannery 16 % more than a boat; the owner of the boat has traded it for 75 % of the brewery, losing \$103. What is the tannery worth?
10. If the interest on \$1 at 6 % is \$.0835, what is the time?
11. Find the cost of 735 fence boards, each 16 ft. long and 5 in. wide, at \$14.50 per M.

## PRACTICAL PROBLEMS IN ARITHMETIC. 33

1. If in  $17\frac{1}{2}$  days 160 men, working 9 hours a day, excavate a cut 900 ft. long, 13 ft. deep and 36 ft. wide, in how many days should 95 men, working 8 hours a day, excavate another cut 1200 ft. long,  $6\frac{1}{2}$  ft. deep, 38 ft. wide, and  $2\frac{1}{2}$  times as difficult to excavate?
2. If, in building the Belfast Railway, rails weighing 80 lbs. to the yard be used, how many tons of rails will be required to finish one mile of the road?
3. Divide three ten-millionths by five hundred-thousandths.
4. Find the cost of 24 planks 16 ft. long, 14 in. wide and  $2\frac{1}{4}$  in. thick, at \$23.50 per M, board measure.
5. A stock of goods valued at \$18500 is insured for  $\frac{3}{5}$  of its value at  $1\frac{3}{5}\%$ . Find the premium.
6. How many shares Bank of Halifax stock can be purchased for \$2237.75 at  $129\frac{3}{4}$ , brokerage  $\frac{1}{8}$  per cent?
7. Express in words 3014506.8754.
8. The ridge of a roof is 16 ft. 6 in. above the eaves, and the eaves are 55 ft. apart. Find the width of one side of the roof.
9. If milk weighs  $64\frac{1}{2}$  lbs. to a cu. ft., and water  $62\frac{1}{2}$  lbs., what per cent is milk heavier than water?
10. If the interest on \$100 for 3 yrs. 4 mos. at 6  $\frac{1}{2}\%$  per annum is \$20, for how long must \$350 remain at interest, at  $4\frac{1}{2}\%$  per annum, to produce \$42?
11. How many lbs. of flour will be required to make 1000 lbs. of bread, if the bread weigh 30 per cent more than the flour used?
12. The factors of the dividend are  $32$ ,  $2\frac{1}{7}$ , and  $7.5$ ; and the factors of the divisor are  $\frac{1}{25}$ , .08, and  $22\frac{1}{2}$ . Find the quotient.

## 34 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Multiply 5 rd. 4 yd. 2 ft. 4 in. by 9.
2. Write in words (a) 1246, (b) .3953, (c)  $\frac{26}{201}$ , (d)  $4 \times 7$  lb.
3. If I sell silk at an advance of  $16\frac{2}{3}\%$  and gain \$0.25 per yd., what is the selling price?
4. Divide 485 into four parts that shall be to each other in ratios of  $3, 4\frac{1}{7}, 5\frac{1}{3}$  and 6 respectively.
5. The perimeter of a triangle is 220 yds., and the sides are in the ratio of 4, 7 and 9. Find the length of the longest side.
6. A hardware merchant sold two stoves for \$30 each, gaining  $20\%$  on one and losing  $14\frac{2}{7}\%$  on the other. How much did the stoves cost him?
7. Three men did a piece of work for which they were paid \$54. If one worked 6 hrs. per day for 11 days, another 9 hrs. per day for 10 days, and the third 12 hrs. per day for 5 days, how much should each receive?
8. A fruit pedler sold 41 oranges at 5 cents each and 68 lemons at 4 cents each, after which he invested one-third of his receipts in bananas. Find the amount paid for bananas.
9. Make a problem in which the interest, principal, and time are given to find the rate per annum.
10. Express (a) .00075 as a per cent.; (b)  $\frac{5}{7}\%$  as a common fraction; (c) 127.302 in words.
11. At 22 cents a sq. yd., how much will be the cost of plastering the walls and ceiling of a room 16 ft. by 14 ft., and 9 ft. 6 in. high, if  $\frac{1}{10}$  be allowed for openings?

1. A speculator sold 130 shares railway stock at 94 $\frac{1}{2}$  and invested the proceeds in bank stock at 234 $\frac{1}{2}$ , paying brokerage  $\frac{1}{4}\%$ , both for selling and buying. How many shares of the latter stock did he buy?
2. The Eiffel tower at Paris is 300 metres high. How many feet high is it? (A metre is 3.37 inches more than a yard.)
3. A man exchanged a pile of wood 24 ft. long, 6 ft. high, and 4 ft. wide for 4500 lbs. of hay at \$8.00 a ton. How much per cord did he receive for his wood?
4. Express .101 of 1 lb. 5 oz. as a decimal of  $\frac{7}{8}$  of 1 qr. 22 lbs. 8 oz.
5. Simplify:  

$$\frac{3}{3 - 1 \div (3 - \frac{1}{3})} \div \frac{6 - 1 \div (6 - \frac{1}{6})}{6\frac{2}{3}} \times \frac{1\frac{1}{2} + 2\frac{2}{3} + 3\frac{5}{6}}{\frac{2}{5} \text{ of } 1\frac{3}{4} - \frac{7}{11} \text{ of } 3\frac{2}{3} \text{ of } 2\frac{1}{9}}$$
6. Two men, *A* and *B*, agreed to build a wall for \$300; *A* sent 5 men 4 days, *B* 5 men for 6 days. How much ought each to receive?
7. A square field contains 22 acres 2 roods. How long will it take a man to run round the boundary at the rate of 12 miles an hour? If the field be increased by 9 acres, so as to form a rectangle whose shorter side is the former side of the square, at what rate does a man run who runs round it in 1 min. 39 sec. longer than was occupied in running round the square field?
8. If 1000 laths cover 70 yards of surface, and 12 $\frac{1}{2}$  lbs. of nails nail them on, what will it cost to lath the ceiling of a church having the following inside measurements: Length 40 ft., width 24 ft., height of side walls 12 ft., height from the floor to the middle point of the ceiling 28 ft. (the laths are nailed to the rafters)? Labor costs 4 $\frac{1}{2}$ c. per yd., nails 6c. per lb. and lath \$3 per M.

## 36 PRACTICAL PROBLEMS IN ARITHMETIC.

1. In a 100-yd. race *A* can beat *B* by 4 yds.; in a quarter of a mile race *C* can beat *A* by 11 yds.; by how much can *C* beat *B* in a mile race, supposing that the average speed of each man when running a hundred yards, a quarter of a mile, and a mile are proportional to 9:8:7?
2. A certain star is five million nine hundred and ninety-five thousand nine hundred and forty-four times as far from the earth as is the sun. State in words the number of seconds which light, travelling one hundred and eighty-six thousand miles per second, will occupy in coming from that star to the earth, if the earth is distant ninety-three millions of miles from the sun; and express your answer in years, supposing a year to equal 365 days 6 hours.
3. Jacob, by contract, was to serve Laban for his two daughters 14 years; when he had occupied 10 yrs. 10 mos. 10 wks. 10 dys. 10 hrs. 10 min., how many minutes had he then to serve?
4. I bought of Poole & Thompson, Montague Bridge, the following pieces of lumber at \$12 per M: 12 boards 16 ft. long and 9 in. wide; eight 2 x 4 scantling 16 ft. long; fifteen 8 x 10 joists 14 ft. long; three 8 x 14 timbers 24 ft. long. Make out a receipted bill for the above.
5. A dealer bought flour for \$900 cash and sold it immediately for \$1080 on 6 months' credit, for which he received a note. If he should get the note discounted at a bank at 6 %, what would be the gain on the flour?
6. How many board feet in a stick of timber 36 ft. long, 12 in. wide, and 20 in. thick? How many square feet in the entire surface of the stick? How many cubic feet in the stick?

## PRACTICAL PROBLEMS IN ARITHMETIC. 37

1. A square farm contains 160 acres. What is the length of the fence that surrounds it?
2. If the difference in time between two places is 3 hrs. 15 min. 20 sec., what is the difference in longitude?
3. Find the amount of a note for \$925, given July 10th, 1894, and paid October 25th, 1895, bearing  $8\frac{1}{2}$  % from date.
4. Find the number of sq. ft. in the surface of a box 3 ft. 6 in. long, 2 ft. 3 in. wide, 1 ft. 4 in. high.
5. A printer used 3 reams 5 quires 19 sheets of paper for printing half-sheet posters. How many did he print, allowing 1 quire to a ream for waste?
6. A farm has two of its four sides parallel and two not parallel; the distance between parallel sides is 70 rods; length of non-parallel sides, 80 rods and 110 rods, respectively. Find area in acres.
7. A man sold 6 horses at \$150 each; on three he gained  $30\frac{1}{2}\%$ ; on the others lost  $20\frac{1}{2}\%$ . Find gain or loss.
8. A can do a piece of work in  $8\frac{3}{4}$  hrs., A and B in  $4\frac{5}{11}$  hrs., and A and C in 4 hours. Find the time, if B and C work together.
9. A and B formed a partnership; A put in \$3000, and at the close of the first year added \$2000; B put in \$4000, and at the close of the second year took out \$2000; at the close of the third year the profits amounted to \$3450. What was each partner's share?
10. A certain lot is 80 ft. by 128 ft. How many 16 ft. boards will be required to make a five-board fence around it? If the boards are 6 in. wide, how many feet of lumber in entire fence?

## 38 PRACTICAL PROBLEMS IN ARITHMETIC.

1. A solid whose base is 10 in. square, and altitude 8 in., equals what part of a 10-in. cube?
2. If there are 48 children in a room 20 ft. long, 18 ft. wide, and 10 ft. high, how many cu. ft. of air to each child?
3. A wagon body, 10 ft. long, 3 ft. wide, and 18 in. deep, holds 36 bus. of corn. If its width be increased 3 in., how many bushels will it hold? Had its height been increased 3 in. and its width remained 3 ft., how many bushels would it have held?
4. What is the weight of water in a full rectangular cistern 7 ft. by 3 ft. by 10 ft., if a cu. ft. of water weighs 1000 oz.?
5. Divide \$640 among *A*, *B* and *C*, so that *B* may have six times as much as *A*, and *C*  $1\frac{1}{2}$  times as much as *B*.
6. Find H.C.F. and L.C.M. of 128, 384, 768, and 2304.
7. Find the L.C.M. of all the prime numbers between 2 and 17, inclusive.
8. A girl who attended school 68 days during a term, was marked 85 % for attendance. How many days was she absent?
9. A man pays \$375 a year rent for a house worth \$5400. Will he gain or lose, and how much, in four years, if he borrows money at 7 % to purchase the house?
10. What rate of premium does 7 % stock bear in the market when the investment pays 6 per cent?
11. What is the net tax of a town whose taxable property is assessed \$430000 at 12 mills in the dollar, 5 % being paid for collecting?

## PRACTICAL PROBLEMS IN ARITHMETIC. 39

1. A man in walking takes 6600 steps in an hour; he reaches the next village in 40 minutes. How many steps distant is the place? How many miles, if each step be 2.7 feet?
2. How many rolls of paper, each 8 yds. long and 18 in. wide, will paper the walls of a room 16 ft. by 14 ft. by 10 ft. high, deducting 174 sq. ft. for windows and doors?
3. I purchase goods for \$500, and sell at the end of nine months at an advance of 20%. Reckoning interest at 5%, what was the real gain per cent. on the investment?
4. January 1st a gas-meter registered 11800 cu. ft. of gas consumed. April 1st it registered 14100 cu. ft. At \$1.70 per thousand cu. ft., what was the cost of gas used in the intervening time?
5. A man having \$6000 on interest at 7%, pays \$360 for the rent of a house. Would he gain or lose, and how much, by investing \$4000 of the \$6000 in a house on which he would have to pay a tax of 12 mills in the dollar, and \$10 for water rent?
6. Miss Ellen Jones makes a dress for Miss Katie Brown for which she furnishes the following materials: 6 yds. perealine at 18c., 2 yds. silesia at 25c.,  $\frac{1}{2}$  yd. grass cloth at 14c.,  $\frac{3}{4}$  yd. velveteen at \$2.00, 4 yds. hair cloth at 45c., 3 spools silk at 8c., 1 spool thread at 4c., 1 spool twist at 5c., 5 yds. cord at 5c., 1 pr. shields, belting 12c., 1 doz. bones 54c., 5 yds. casing at 4c., 1 piece binding ribbon 18c., work \$11.00. Make out Miss Brown's bill and receipt it.

## 40 PRACTICAL PROBLEMS IN ARITHMETIC.

1. If  $\frac{1}{2}\%$  of 32 times 1 be multiplied by  $\frac{1}{2}$ , the product divided by  $\frac{2}{3}$ , the quotient increased by  $4\frac{1}{2}$ , and the sum diminished by  $\frac{3}{7}$  of itself, what is the remainder?
2. I hold Mr. Blake's note for \$3600, dated January 8th, 1896, due in one year without interest. What is the cash value July 20th, 1896, money being worth 6  $\frac{1}{2}$  %?
3. A cube immersed in a rectangular reservoir 36 in. long and 16 in. wide raises the water 3 inches. What is the edge of the cube?
4. What number increased by 25 % of itself equals 1200? What number diminished by  $17\frac{1}{2}$  % of itself equals 36.3? 112 is 140 % of what number? 60 % of what number equals 90?
5. A reservoir supplies a town with 4573800 gallons of water daily. If its surface area is 7 acres, how much will the water be lowered in it, providing one-half as much runs in as runs out?
6. An agent in Toronto sells 4500 bus. wheat for me at  $64\frac{1}{2}$  c. a bus.; the proceeds he invests in wool at 16c. lb. If his commission for selling the wheat be  $1\frac{1}{2}$  and his commission for buying the wool 2  $\frac{1}{2}$ , how many lbs. of wool does he buy for me?
7. Find the present worth of the following note, June 18th, 1896, discounted at the bank, rate of discount being 6 %:—  
\$320.00.      Charlottetown, P.E.I., Feb'y 5th, 1896.  
Six months after date, for value received, I promise to pay W. W. Stetson, or order, three hundred and twenty dollars.      G. J. McCormae.
8. From a lot of land 40 rds. square I sold 40 sq. rds. What is the remainder worth at \$45 an acre?

## PRACTICAL PROBLEMS IN ARITHMETIC. 41

1. Make out a bill of goods likely to be purchased at a hardware store, and receipt payment.
2. A schoolhouse is insured for 3 yrs. at 1 $\frac{1}{2}$  % premium, which is \$60; the insurance valuation is  $\frac{2}{3}$  of the cost of the house. What is the underwriter's loss if it burns?
3. A landlord owns 23040 acres of land in the form of a square. How much will he have to pay a surveyor to lay it out into lots of 160 acres each, if he has to pay \$1.25 for every mile run?
4. I have \$2000 on interest at 6 %. What sum must I invest in 8 % bonds, selling at 98, to yield the same annual income?
5. A lumberman owns 7486 acres of timbered land in the form of a square. How many miles around it?
6. The distance from Charlottetown to Summerside is 60 miles. At \$1 apiece for posts and 7c. a lb. for wire, what will the posts and wire for a telephone line cost if the posts are set 50 yds. apart and a lb. of wire stretches 50 ft.?
7. A room floor contains 432 sq. ft., and its breadth is to its length as 3 is to 4. What are the dimensions of the room?
8. How many barrels of flour at \$4 a barrel shall an agent sell so that he may remit to his principal \$3510, after deducting a commission of 2 $\frac{1}{2}$  %?
9. How much will it cost to paper the walls and ceiling of a room 54 $\frac{3}{4}$  ft. long, 30 ft. wide, and 10 ft. 6 in. high, at 27 $\frac{1}{2}$  c. a sq. yd.?
10. Deduct  $\frac{3}{4}$  of  $\frac{4}{5}$  from  $\frac{2}{3}$  of  $4\frac{2}{5}$ , add to the remainder  $\frac{1}{8}$ , divide the sum by  $6\frac{2}{9}$ , and change to a decimal.

## 42 PRACTICAL PROBLEMS IN ARITHMETIC.

1. A man drew 30  $\frac{1}{2}$  % of his bank deposits and spent 25  $\frac{1}{2}$  % of the money drawn to purchase a horse for \$97.50. Find how much he had in the bank before drawing.
2. Find the face of a 90-day note that when discounted at 12  $\frac{1}{2}$  % will pay for 137  $\frac{1}{4}$  yds. cloth at \$2  $\frac{1}{2}$  a yd.
3. Area of the gable end of a house is 378 sq. ft. length of base, 14 yds. Find height of ridge.
4. A mine-owner made a contract to deliver 1000 tons of coal in 4 months, employing 500 men to get it out; at the end of 3 months, with only 3000 tons dug, 450 men struck. How many must he advertise for to fulfil his contract?
5. Find the time of day if  $\frac{3}{5}$  of the time past midnight equals the time to midnight again.
6. My agent sold in Montreal 1000 bus. of wheat commission 2  $\frac{1}{2}$  %, at 84c; invested proceeds in cloth, commission 2  $\frac{1}{2}$  %, at 84c. a yard. Find number of yards bought.
7. Express by Arabic notation twenty billion, nineteen thousand and nineteen; by Roman notation six hundred and five thousand; in figures, MDL; in words, 625625.
8. Add  $1\frac{7}{25}$  expressed decimals to 600 and twenty-five ten-thousandths; diminish the sum by  $596\frac{117}{2000}$  expressed decimals; multiply the remainder by 6 and 34 thousandths; divide the product by six thousand and thirty-four ten-thousandths.
9. Divide 375 by .75; .75 by 375. Find the product of their quotients and express the answers in words.
10. If 6 men dig a cellar 22.5 ft. long, 17.8 ft. wide, and 10 ft. 3 in. deep, in 3 days of 10 hrs. and 15 min. each, how many men will it require to dig another, in 12 days of 8.2 hrs. each, 45 ft. long,  $34\frac{2}{3}$  ft. wide, and 12.3 ft. deep?

## PRACTICAL PROBLEMS IN ARITHMETIC. 43

1. How much will it cost to plaster a room 16 ft. 9 in. long, 14 ft. 8 in. wide, and 10 ft. 6 in. high, if there are three windows 6 ft. by 2 ft. 9 in., two doors 7 ft. by 3 ft., and a base-board 1 ft. wide; the price of plastering being 25c. a square yard?
2. In an orchard,  $\frac{3}{5}$  of the trees are apple-trees,  $\frac{1}{10}$  peach-trees, and the remainder pear-trees, which are 20 more than  $\frac{1}{2}$  of the whole. How many trees in the orchard?
3. A having a farm of 109 ac., which rents for \$681.25, sells the same for \$125 an acre, and invests the proceeds in Dom. of Canada 6% at 108 $\frac{1}{2}$ , brokerage  $\frac{1}{2}$  for purchasing. Will his yearly income be increased or diminished, and how much?
4. A man having a span of horses for sale, offered them for \$480 cash or a note of \$550 due in 1 yr. 8 mo. without interest; the buyer accepted the latter offer. Did the seller gain or lose thereby, and how much, interest being 6%?
5. A fruit dealer bought oranges at the rate of 15c. per dozen and sold them at the rate of 3 for 10c.; his profits were \$72. How many boxes of 24 doz. oranges each did he buy?
6. If a farmer uses 1 pound of fertilizer on a piece of ground 2 yd. square, how much will he use on  $\frac{3}{4}$  of an acre?
7. If it cost \$425 to fence a field 72 rd. by 98 rd., what will it cost to fence a square field of the same area?
8. What are the contents of a log 36 ft. long, 18 in. in diameter at the smaller end, and 24 in. at the larger end?

## 44 PRACTICAL PROBLEMS IN ARITHMETIC.

1. In a square field containing  $1\frac{3}{5}$  acres, how far is the centre from each corner, and from the middle of the side?
2. Divide 109 mls. 7 fur. 29 rds. 7 ft. 3 in. by  $4\frac{1}{2}$ .
3. How many days of 7 hrs. each will it take a man to travel 390 miles, if he goes 130 miles in 3 days of 14 hrs. each?
4. I rented a house at  $7\frac{1}{2}\%$  of its value, and in 9 mos. 18 days I received \$122.08 rent. Find the value of the house.
5. Find the face of a sight draft costing \$76.40, when exchange is  $2\frac{1}{2}\%$ .
6. A debt of \$53.95 was due May 21st, 1880, but settled November 9th, 1874, at a discount of 6 %. How much money was paid?
7. Find the side of a square field equal in area to a rectangular field 676 yds. long by 256 yds. wide.
8. How far from the house must the foot of a 25-ft. ladder be placed to reach the eaves, 23 ft. from the ground?
9. How much cheaper would it be to pave a street one-fourth of a mile long and 60 ft. wide with asphalt at 22c. per sq. ft., than to pave it with granite blocks at \$3.10 per sq. yd.?
10. For what sum must a cargo of goods valued at \$12360 be insured at  $1\frac{3}{4}\%$  to cover both property and premium in case of loss?
11. What is the distance from the lower corner of a room 24 ft. long, 18 ft. wide, and 12 ft. high to the opposite corner?

## PRACTICAL PROBLEMS IN ARITHMETIC. 45

1. Make and solve a problem illustrating the application of square root in finding the side of a right-angled triangle.
2. What will it cost to plaster the walls and ceiling of a room 18 ft. long, 12 ft. wide, 9 ft. high, at 40c. per sq. yd? How many cords of wood would the room hold if completely filled?
3. Simplify  $\left\{ \frac{12 - 0.6}{2} + \frac{16 - 0.8}{4} - \frac{17}{4} \right\} \div 18\frac{3}{4}$ .
4. A boat whose rate of sailing in still water is 14 miles an hour, was accelerated  $3\frac{1}{2}$  miles per hour in going down stream and retarded the same distance in coming up. It was 4 hours longer in coming up a certain distance than in going down. What was the distance?
5. If a man buys a ton of potatoes for \$15 and sells them for 15c. a peck, what is his gain per cent.?
6. A druggist bought 1260 lbs. of alum, avoirdupois, and retailed it by Troy weight. How many more lbs. did he sell than he bought?
7. The rent of a square field at £2 14s. 6d. per acre amounts to £27 5s. Find the cost of putting a paling fence around the field at 9d. a yard.
8. Simplify  $\frac{4\frac{1}{3} \text{ of } 3 - 3\frac{1}{4} \text{ of } 3\frac{1}{2}}{4\frac{1}{4} - 3\frac{1}{4}} \div \left\{ \frac{1}{6\frac{1}{2} \text{ of } 3\frac{1}{3}} + \frac{1}{2\frac{1}{4}} \right\}$
9. If a mixture be made of 9 lbs. of candy worth 12c. a lb., 7 lbs. at 16c. a lb., and 4 lbs. at 20c. a lb., what will 1 lb. of the mixture be worth?
10. A sidewalk is 150 ft. long and 4 ft. wide; it is made of 2-inch plank, crosswise on 4  $\times$  4 scantling. Find the cost of the lumber at \$24 per M.

## 46 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Goods bought at 40 % and 10 % off were sold at  $12\frac{1}{2}$  % above list. If the merchant's expenses are 20 % of his sales, does he make or lose, and what per cent. upon his investment?
2. A farmer's wheat crop averages, per acre,  $\frac{3}{5}$  of what his oat crop does, but he receives 50 % more per bushel for it. If he receives \$1800 for his entire crop of 60 ac. of oats and 40 ac. of wheat, find the value of an acre of wheat.
3. I bought a horse in Liverpool for £30 9s. 4d. and sold it in Charlottetown for \$164.75, paying £6 2s. 3d. freight. What was my gain or loss per cent.?
4. Find the number of revolutions made by a carriage wheel  $4\frac{7}{8}$  ft. in diameter while passing over the road from Georgetown to Cardigan, which is 6 mi.
5. In a school of 28 scholars, 3 pupils are  $15\frac{7}{8}$  yr. old, 4 others of  $14\frac{3}{4}$ , 3 of  $13\frac{1}{2}$ , 5 of  $11\frac{1}{2}$ , 6 of  $9\frac{2}{3}$ , and 7 of  $8\frac{1}{4}$ . Find the average age of the scholars.
6. What per cent. of 964 must be added to that number to make the sum 1006?
7. If the unit of measurement be  $\frac{5}{9}$  yd., what is the measure of  $3\frac{1}{2}$  in.?
8. Express as the decimal of a week the time you are in school each day?
9. The Belfast Railway ran across a man's farm of 150 ac., which is  $1\frac{1}{4}$  mi. long, and took a strip 24 yd. wide, for which the company paid at the rate of \$45 an acre. How much did he receive?
10. How far will a mower be drawn in mowing a square 7-acre field if the mower cuts a  $3\frac{3}{4}$ -foot swath?

## PRACTICAL PROBLEMS IN ARITHMETIC. 47

1. Multiply  $4\frac{1}{9}$  by  $7\frac{1}{3}$  and divide  $4\frac{4}{7}$  by  $21\frac{1}{6}$  by  $\frac{3}{4}$  of  $1\frac{1}{5}$ , and find the difference between the sum and difference of these results.
2. Find the date midway between Queen Victoria's birthday and Christmas.
3. If stock bought at  $98\frac{1}{2}$  will pay  $6\frac{1}{2}\%$  on the investment, at what rate should it be bought to pay  $8\frac{1}{2}\%$ ?
4. Express  $\frac{1}{16}$  of 11s. 11d. +  $\frac{3}{4}$  of 4 guineas + .06 of £4 -  $\frac{1}{15}$  of  $7\frac{1}{2}$ d. as a fraction of £19 4s. 6d.
5. What sum of ready money will cancel a debt of \$384.50, due in 3 mo. 20 dy., money being worth  $5\frac{1}{2}\%$  per annum?
6. New York being 3 degrees east from Washington, and San Francisco 45 degrees 25 min. west, what time will it be in New York when it is noon at San Francisco?
7. A journey of 560 mi. was made by rail, steamer, and coach. The distance by coach was one-fourth and the distance by sea three-fourths of that by rail. The fare per mile by coach was double, and by sea four-fifths of that by rail. What was the expense of the whole journey, railway fare being 1.571428d. per mile?
8. How many cubic feet in a ton of ice, if a gallon of water weighs 10 lb., measures 277.274 cu. in., and expands one-tenth in freezing?
9. How many half-crowns are there in 6705 guineas?
10. I invest equal sums in a 4% stock and in a 3% stock and get 5% for my money; the 4 per cents are at 90. What is the price of the 3 per cents?

## 48 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Simplify (a)  $3.416 + 1.00191 - .24979$ ; (b) divide 37.436 by .139.
2. A square field contains  $3\frac{1}{4}$  ac. Find the cost of making a path three yards wide inside the field, round the boundary, at 32s. per square yard.
3. Subtract .378 of 1s. 6 $\frac{1}{2}$ d. from .378 of 2s. 9d.
4. A sum of money is to be divided among 11 men and 18 boys, and 5 men are to receive as much as 9 boys. When 3 men and 3 boys have received their shares, what fraction of the whole sum will remain?
5. Simplify:  

$$\left( \frac{2\frac{1}{5}}{3\frac{2}{3}} + \frac{400}{8\frac{1}{3}} - 4\frac{1}{2} \text{ of } 5\frac{1}{3} \right) \div 5\frac{5}{11} + \frac{3}{5} \text{ of } 1\frac{1}{2}\frac{1}{5}6 + 2\frac{1}{5}0$$
6. Find value of  $\frac{4}{5}$  of £1 +  $\frac{5}{8}$  of 1s. +  $\frac{5}{28}$  of a guinea +  $\frac{3}{5}$  of £1 6s. 8d.
7. The circumference of the earth is 40000000 metres the length of a metre being 39.37079 in.; calculate the diameter of the earth in miles, assuming the ratio of the circumference of a circle to its diameter to be 355 : 113.
8. A watch, set on Friday at 9 p.m., gains 45 sec. in 12 hr.; what time does it show on the next Monday at 3 p.m.?
9. When silk is sold at 19 francs 25 centimes per metre find the corresponding price per yard in shillings and pence; supposing £1 = 25 fr. 20 cent., and 1 metre = 39.371 in.
10. Obtain the cube root of 10.01 and the square root of 66135.3171845, to 5 places of decimals.

## PRACTICAL PROBLEMS IN ARITHMETIC. 49

1. Two cog-wheels, one with 15 teeth, the other with 28 teeth, work together. If the former turns round 16 times in  $7\frac{1}{2}$  sec., how many times will the latter turn round in 21 sec.?
2. An engine while driving machinery burns coal at the rate of 1 ton 12 cwt. 2 qr. in 8 hr. 40 min. When the machinery is not in motion, the consumption of coal is only  $\frac{1}{4}$  of this quantity. How much coal will the engine burn in 1584 hr., during  $\frac{1}{3}$  of which time the machinery is at rest?
3. *A* and *B* ride a race of 31 mi. on bicycles. The driving-wheel of *A*'s machine makes 3410 revolutions per hour, and has a circumference of 168 in.; that of *B* makes 3520 revolutions per hour, and has a circumference of 162 in. Which will win, and by how much?
4. Add together .3025 of £9 7s. 6d., 1.3628 of 10s., and .0674 of 10d., and express the answer in francs and centimes (1 franc =  $9\frac{1}{2}$ d.).
5. An Irish acre is to an English acre as 49 is to 30 $\frac{1}{2}$ . How many English acres are there in a farm containing 852 $\frac{1}{2}$  Irish acres?
6. If a certain amount of work is done by 9 men, 12 women, and 13 boys in 11 dy., how long will the same work take if 18 men, 3 women, and 5 boys are set to do it, assuming that the ratio of a man's work to a woman's is as 5 to 3, and a woman's work to a boy's as 4 to 3?
7. A piece of timber 15 in. square at each end, and 15 ft. long, is to be measured. Find its contents, and how far from the end must it be cut across, so that the piece cut off may contain 1 solid foot?

## 50 PRACTICAL PROBLEMS IN ARITHMETIC.

1. There is a triangular cornfield whose sides are 150, 200, and 250 yds. Find the number of acres contained in the field, and the cost of reaping the corn at \$1.90 per acre.
2. Make out and receipt the following invoice:—300 oranges at  $10\frac{1}{2}$ d. per dozen; 1250 apples at 5 for 3d.; 2500 eggs at 9d. for 10 eggs; 16 boxes figs, each 5 lb. oz., at 7d. per pound;  $3\frac{1}{2}$  sacks of potatoes, each 3 bu. at  $4\frac{1}{2}$ d. per gallon; 5 gal. strawberries at  $5\frac{1}{2}$ d. per quart; 3 score pounds potatoes at 5 lb. for  $3\frac{1}{2}$ d.;  $2\frac{1}{4}$  lb. tomatoes at 11d. per pound;  $2\frac{1}{2}$  pk. peas at 1s. 5d. per peck; 75 eggs at 9d. per dozen.
3. A gentleman has a garden in the form of an equilateral triangle, the sides of which are each 50 ft.; at each corner of the garden stands a tower; the height of the tower A is 30 ft., that of B 34 ft., and that of C 28 ft. At what distance from the bottom of each of these towers must a ladder of same length with each side be placed so that it may just reach the top of each tower?
4. What are the contents of 27 boards, each 13 ft. long and 18 in. wide?
5. There is a meadow of 10 ac. in the form of a square, and a horse tied equidistant from each corner of it. What must be the length of the rope that will permit the horse grazing over every part of the meadow?
6. The largest of the Egyptian pyramids is 800 ft. square at the base. How long a road, 4 rd. wide, would occupy as much land as the base of the pyramid?
7. The length of a rectangular field being 25 chains links, and its breadth 14 chains 75 links, what number of acres does it contain?

## PRACTICAL PROBLEMS IN ARITHMETIC. 51

1. In a block of 25 houses, each house has 17 windows, each window 4 panes, and each pane measures 18 in. by 9 in. What will be the cost of glazing all the windows at 6d. per square foot?
2. A rectangular cistern  $10\frac{1}{2}$  ft. in length,  $6\frac{1}{4}$  ft. in breadth, and  $3\frac{1}{2}$  ft. in depth, contains  $140\frac{2}{3}$  cu. ft. of water. What is the least number of bricks, each 9 in. long by  $4\frac{1}{2}$  in. wide by 3 in. thick, that must be thrown into the cistern to make the water rise to the top, a brick being found to absorb water to the extent of  $\frac{1}{6}$  its volume?
3. Express 5000303 farthings in £ s. d. and subtract the result from 10021 guineas.
4. Two acres of land are to be cut from a rectangular field whose width is 2 chains 50 links, by a line parallel with either end. What is the length of the plot?
5. A 9-months' note discounted at 6% yields \$477.25. Find the face of the note.
6. If stock bought at 92 will pay 7% on the investment, at what rate should it be bought to pay 10%?
7. A pile of wood 128 ft. long, 4 ft. wide, and 3 ft. 8 in. high, is sold for \$3.50 a cord. How much money is received for it?
8. An agent sells goods for his firm, payable at the following dates:—\$120 due 7th January; \$130 due 9th February; \$200 due 15th March; \$500 due 20th May; \$240 due 15th August. Find the average time of payment.
9. A room is 14 by 16 ft. What will it cost to carpet the floor—carpet sewed and laid at 90c. a yard—i.e. 9 in. are allowed for matching, stripes laid lengthwise, carpeting  $\frac{3}{4}$  yd. wide?

## 52 PRACTICAL PROBLEMS IN ARITHMETIC.

1. *A* owned  $\frac{5}{6}$  of a factory and sold  $\frac{3}{4}$  of his share to *B*, who sold  $\frac{1}{2}$  of what he bought to *C*, who sold  $\frac{2}{3}$  of what he bought to *D*. What part of the factory did each of them own?
2. A note for \$500 dated October 17th, 1899, was paid April 12th, 1902, with interest at 6%. What was the amount paid?
3. A ball discharged directly upwards returns to the earth in 16 sec. How high did it ascend?
4. A man travelled northward 24 mi., then eastward 36 mi., then southward 10 mi., then northward 4 mi. How far was he then from the starting point?
5. What is the face of a draft due 90 dy. after sight, with interest at 5%, which can be bought for \$1808.25 when exchange is  $1\frac{1}{4}\%$  premium?
6. A druggist purchased  $9\frac{3}{4}$  oz. of quinine at 40c. an ounce avoir., and sold it at 60c. an ounce troy. How much was his profit?
7. Find cost of 4 ac. 3 ro. 5 po. of land at \$65.50 per acre.
8. A tree 140 ft. high is in the centre of a circular island 100 ft. in diameter; a line 600 ft. long reaches from the top of the tree to the further shore. What is the width of the stream, the land on each side being on the same level?
9. Find the cost of a 45-days' draft for \$3800, discount  $\frac{3}{4}\%$ , interest 7%.
10. If 20 men in 10 dy. of 8 hr. each dig a ditch 150 ft. long, 4 ft. wide, and 3 ft. deep, what length of ditch 3 ft. wide and 2 ft. deep could be dug by 16 boys in 12 dy. of 6 hr. each, if a boy does only half as much work as a man?

## PRACTICAL PROBLEMS IN ARITHMETIC. 53

1. If a person loans me \$250 for 8 mo., for how long a time must I loan him \$400 as an equivalent?
2. How many square yards were there in the area of Solomon's Temple, whose dimensions are mentioned in 1. Kings, chap. vi., reckoning the cubit to be 18 in.? If Noah's ark was 300 cubits long, 50 wide and 30 high, how many cubic yards did it contain?
3. One-quarter acre of ground is covered with wood piled 12 ft. high; how much is it worth at \$3.25 a cord?
4. Bought \$970 bank stock at 4 per cent. advance; sold at a discount of  $2\frac{1}{2}$  per cent. Find the loss.
5. The sides of a triangular lot are  $115\frac{1}{2}$  ft.,  $128\frac{1}{2}$  ft., and  $134\frac{3}{4}$  ft. respectively. How many boards will it take, and what will it cost to fence it with lumber at  $\$7\frac{1}{2}$  per M., the longest boards possible being used and the fence being 5 boards high, the bottom one 10 in. wide, two 6 in. wide, and the others 4 in. wide?
6. I have two pieces of cloth, each 15 yd. long; one is 25 % longer than it should be, and the other is 25 % shorter than it should be. What would be the combined length of the two pieces if each was of the proper length?
7. Copper weighs 550 lb. and tin 462 lb. to the cubic foot. What is the weight of 1 cu. ft. of the mixture containing 6 parts of copper and 5 parts of tin?
8. A note dated January 4th, 1895, for \$9874.69 with interest at 6 %, had the following endorsements:—July 1st, 1895, received \$379.28; Feb'y 18th, 1896, received \$458.74. What was due on the note January 1st, 1898?

## 54 PRACTICAL PROBLEMS IN ARITHMETIC.

1. If it cost \$14 to paint the walls and ceiling of room 25 ft. long, 20 ft. wide, and 10 ft. high, how much will it cost to paint the walls and ceiling of a room 50 ft. long, 40 ft. wide, and 20 ft. high?
2. Two men start from the same point. One travels 30 mi. due north and the other 40 mi. due west at the same time, and then they both turn and travel towards each other at their former rates of speed. When they meet, how far will each have travelled from the common starting point?
3. 9 hr. 6 min. 8 sec. is what part of 13 hr. 39 min. 12 sec.?
4. Find the exact interest at 5% per annum on \$312.75, from September 11th, 1901, to November 23rd, 1901.
5. Find the cost of a stair carpet for a flight of 12 steps,  $7\frac{1}{2}$  in. rise and 10 in. deep, at 68 cents a yard, the steps to include 9 in. floor space at the top of the stairs.
6. A plot of land 200 ft. wide can be exactly divided into lots 42 ft. front, 48 ft. front, and 56 ft. front. How many feet in length must the plot necessarily be to answer these conditions?
7. Find the value of
$$\frac{\frac{9}{11} + (2\frac{5}{6} \text{ of } 1\frac{1}{11}) - 1\frac{9}{17} (3\frac{3}{13} - 2\frac{1}{4}) + \frac{4\frac{9}{11}}{1\frac{2}{5}} \text{ of } 2\frac{1}{7}}{9\frac{1}{16} \times 4\frac{21}{6} \times \frac{2\frac{7}{11}}{1\frac{5}{11} \text{ of } 5\frac{3}{10}}}$$

$$\frac{12825}{9.16} \times \frac{4.216}{342} \times \frac{2.7}{1.5318}.$$
8. If I purchase D. A. R. 6 per cent. stock at 99 $\frac{1}{2}$ , brokerage  $\frac{1}{8}$  per cent., and at the end of 6 mo. sell it at 104 $\frac{1}{2}$ , brokerage  $\frac{1}{8}$  per cent., what per cent. do I make on my investment?

## PRACTICAL PROBLEMS IN ARITHMETIC. 55

1. The assessed valuation of a school district is \$23000, and a tax of \$115 upon said district is voted at the annual school meeting. Find the tax on a farm assessed for \$1650 in said district.
2. Find the sum of 23 ac. 1 ac. 93 $\frac{1}{4}$  sq. rd. and 36 sq. rd. 18 sq. yd.
3. The net price of an article, after deducting discounts of 33 $\frac{1}{3}$  % and 25 % from the list price, was \$4.87 $\frac{1}{2}$ . What was the list price?
4. The proceeds of a 4-months' note made and discounted at Bank of Nova Scotia, August 14th, 1901, at 6 $\frac{1}{2}$  % per annum were \$225.40. Find the face of the note.
5. A merchant sold a quantity of goods for \$93.15, and thereby lost  $\frac{2}{7}$  of what the goods cost him. Find their cost.
6. A has \$8 and B \$7, with which they buy a boat for \$15. C gave \$10 for  $\frac{1}{3}$  interest in the boat, with the understanding that each of them shall own only  $\frac{1}{3}$  of the boat. How much of the \$10 received from C belongs to A and how much to B?
7. Divide the sum of .1 and .9 by .1, and to the result add .0007. Divide the result thus obtained by the difference between 56.48932 and 43.35730.
8. Find my annual income from an investment of \$4545.75 in Bank of P. E. I. 4 % stock at 119 $\frac{1}{2}$ , brokerage,  $\frac{1}{8}$  %.
9. Find the altitude of a right-angled triangle whose hypotenuse is 366 ft. and base 360 ft.
10. The principal is \$930, the interest is \$115.32, and the rate is 6 %. Find the time.

## 56 PRACTICAL PROBLEMS IN ARITHMETIC.

1. A farmer paid \$47.25 insurance premium on head of horses, the rate being  $1\frac{1}{2}\%$ . How much was the average insurance per head?
2. A cord of wood 63 ft. long, 4 ft. wide, 8 ft. high was sold for \$4.75 a cord. For how much was it sold?
3. Men *A* and *C* trade in partnership. *A* furnishes the capital and is to have  $\frac{1}{3}$  of the gain for extra services. *A* and *C* furnish \$3000 each and the gain \$5760. What is the share of each?
4. At \$3.50 a bush, what will it cost to build the walls of a cellar 15 ft. long, 18 ft. wide, and 5 ft. deep, the wall to be 2 ft. thick and to extend 30 in. above the ground?
5. The dividend is 1864, the quotient 66, and the remainder 12 less than the divisor. What is the divisor?
6. How many acres in a rectangular field  $\frac{1}{2}$  mi. long and  $\frac{1}{3}$  mi. broad?
7. A ladder 78 ft. long stands perpendicularly against a building. How far must it be pulled out at the foot so that the top may be lowered 6 ft.?
8. A man loaned two equal amounts of money, one at  $4\frac{1}{2}\%$  and the other at  $4\frac{1}{2}\%$ , receiving \$8.50 interest per month. How much did he loan?
9. A man gave his son  $\frac{1}{2}$  of his estate and divided the rest equally between his wife and daughter, each receiving \$500 less than half as much as the son. What was the value of the estate?
10. Multiply  $126\frac{2}{3}$  by  $36\frac{1}{3}$  without reducing to improper fractions.

## PRACTICAL PROBLEMS IN ARITHMETIC. 57

1. If  $\frac{3}{5}$  of the value of a horse is equal to  $\frac{1}{2}$  of the value of the harness, and both together are worth \$340, what is the value of each?
2. A hare is 70 leaps before a hound, and takes 5 leaps while the hound takes 3; but 3 of the hound's leaps equal 7 of the hare's. How many leaps will the hound take to catch the hare?
3. A commission merchant sold 1300 bbl. of flour at \$5.75 per barrel, receiving a commission of  $3\frac{1}{2}\%$ , and invested the proceeds in coffee at 28c. a pound, first deducting 2% commission. What was his entire commission? How many pounds of coffee did he buy?
4. Find the date of maturity of a note which falls due 90 dy. before March 15th, 1902; of one that falls due 90 dy. after March 15th, 1902.
5. What number diminished by  $33\frac{1}{3}\%$  of its 60% leaves 24?
6. If a man every 5 mo. spends what he earns in 2 mo., and earns \$530 every  $2\frac{1}{2}$  mo., how much does he save in a year?
7. I buy hardware, receiving 30%, 20%, 10%, and 5% off, and settle the bill with \$957.60. What was the list price of the bill?
8. Divide \$1200 among *A*, *B*, *C*, and *D*, so that the difference between the amounts received by any two consecutive persons will be \$20.
9. Reduce  $\frac{3}{8}$  to a decimal fraction, multiply the result by 24-thousandths, subtract 4 ten-thousandths from the product, and divide the remainder by 5-millionths.

## 58 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Simplify:

$$\frac{\left( \frac{1}{2 - \frac{3}{4 + \frac{5}{6}}} \times \frac{1}{2 + \frac{3}{4 + \frac{5}{6}}} \div 5^{\frac{4}{5}} \right) \left( \frac{1\frac{3}{4} \text{ of } 1\frac{1}{4}}{3\frac{2}{5} + 1\frac{1}{11}} + \frac{4}{5 + 7 + \frac{5}{9}} \right)}{2}$$

$$\left[ 1\frac{1}{4} \div \left\{ \left( \frac{3}{17} \times 1\frac{1}{2} \right) - \frac{1}{18\frac{5}{9}} \right\} \right] \div \left[ \frac{1.5}{.075} \times \frac{3.25}{2\frac{1}{6}} \right]^{2 + 4}$$

2. How much must a watch be marked that cost \$1.00 so that 4% may be deducted and a profit of 20% made?

3. A note of \$150, dated March 30th, 1893, was paid July 4th, 1893, with interest at 6%. What was the amount? What would have been the amount at  $7\frac{1}{2}\%$ ?

4. An agent remitted \$2829.65 for the sale of goods after deducting \$286.35 for freight charges and 1% commission of 5%. What amount was received by the agent?

5. If a tank 6 ft. long, 3 ft. wide, and 2 ft. deep contains  $4\frac{1}{2}$  hhd. of water, how deep must a tank be that is 8 ft. long and  $5\frac{1}{2}$  ft. wide to contain  $22\frac{3}{4}$  hhd. of water?

6. *B* sells  $\frac{1}{4}$  of his cattle to *A*,  $\frac{2}{5}$  to *C*,  $\frac{3}{7}$  of the remainder to *D*, and finds that 48 head is  $\frac{3}{16}$  of what he has left. How many cattle had he at first?

7. A man purchased a horse, giving in payment his note at 6%. At the end of 3 yr. 6 mo. he found that he owed \$42 interest. How much did the horse cost him?

8. At what per cent. below par must  $4\frac{1}{2}\%$  stock be quoted to yield the same per cent. on the investment as  $5\frac{3}{4}\%$  stock at a premium of  $23\frac{1}{2}\%$ , brokerage  $\frac{1}{2}\%$  in each case?

PRactical PROBLEMS IN ARITHMETIC. 59

1. Fifteen persons agree to purchase a tract of land, but three of the company withdrawing, the investment of each is increased \$150. What does the land cost?
2. *A* can walk round a racecourse in 12 min., *B* in 15 min., and *C* in 18 min. If they start together and keep walking, each at his own rate, how many minutes will elapse before they are all three together at the starting point, and how many times will each have made the circuit?
3. *A* and *B* are partners. *A*'s capital is to *B*'s as 5 to 8; at the end of 4 mo. *A* withdraws  $\frac{1}{4}$  of his capital and *B*  $\frac{2}{3}$  of his; at the end of the year their whole gain is \$400. How much of the gain does each get?
4. A stove manufacturer purchased old iron at \$ $\frac{83}{100}$  per 100 lb., and makes out of it stoves weighing 125 lb. each, which he sells at \$15 $\frac{1}{2}$  each. How much does he gain on each 100 lb. of iron?
5. Two rafters, each 24 ft. long, meet at the ridge of a roof 12 ft. above the body of the house. How wide is the house?
6. *A* bought a  $\frac{2}{7}$  interest in a coasting vessel, and sold  $\frac{3}{7}$  of his interest to *B*, who afterwards sold  $\frac{3}{4}$  of his interest to *C* for \$2116. Find the value of the vessel at the rate paid by *C*.
7. The trustees of a certain school district wish to build a schoolhouse to cost \$500. The cost of collecting this sum, together with several incidental expenses, will amount to \$18.75. The total cost must be raised by a tax on property valued at \$26304. How much will I have to pay on a piece of property valued at \$2250?

## 60 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Teas at 59c., 65c., and 76c. per pound respectively are mixed in equal quantities and sold at \$1 a pound. Find the gain per cent.
2. Three men bought a factory. *A* gave \$20000, *B* gave  $\frac{2}{3}$  more than *A*, and *C* gave 25% less than the total amount paid by both the others. If a 6% dividend is declared on the capital stock, how much money should *A* receive?
3. A pole 60 ft. high broke into two pieces, such that  $\frac{2}{5}$  of one piece equalled  $\frac{2}{7}$  of the other. What was the length of each piece?
4. How many cubic feet in a wall 2 ft. thick and 6 ft. high, built about a rectangular cellar whose interior dimensions, when the wall is completed, shall be 20 ft. long and 16 ft. wide?
5. For how much must I make the face of a note, dated July 18th, 1902, for 3 mo., in order to get from the bank which discounts at 6%, \$6600?
6. June 12th, 1902, John Smith buys of Prowse Bros. Charlottetown, 3 yd. silk at \$1.45;  $2\frac{1}{2}$  yd. lining at 20c. 3 pr. kid gloves at \$1.25; 30 buttons at 25c. a dozen  $\frac{1}{2}$  doz. handkerchiefs at 25c. each; 1 hat for \$2.75. (A discount of 5% is allowed on the amount of the purchase. Make out an itemized bill and receipt it in full.)
7. If 8 persons eat \$40 worth of bread in 6 mo., when flour is \$7 a barrel and labor \$40 a month, how many dollars' worth will 24 persons eat in  $8\frac{2}{5}$  mo., when flour is \$5 a barrel and labor \$50 a month?
8. The owner of  $\frac{3}{11}$  of a mine sold  $\frac{9}{10}$  of his share for \$40500. At the same rate what should he who owns  $\frac{2}{5}$  of the same mine get for  $\frac{5}{9}$  of his share?

## PRACTICAL PROBLEMS IN ARITHMETIC. 61

1. A farmer has a 3-ac. field in the form of a right-angled triangle. One of the perpendicular sides is 242 yd. long. How long is the other?
2. A man received \$33.39 interest on a sum loaned 5 yr. previous at 7 %. What was the sum loaned?
3. If a dealer uses 14 oz. to the pound, how much does a person actually get who buys 120 such pounds? How much per cent. does the dealer gain?
4. If \$7000, 8 % stock, be sold for \$150, and proceeds be invested in 6 % stock at 105, find the difference in the income.
5. A man bought hats for \$1.25 each. He sold half of them at a profit of  $33\frac{1}{3}\%$ . The remainder he sold at a loss of \$50, and then found that he had gained  $8\frac{1}{4}\%$  on the whole transaction. How many hats did he buy?
6. A's rate of working is to B's as 4 to 3, and B's is to C's as 2 to 1. How long will it take C to do what A would do in 6 days?
7. A bath can be filled by the cold water pipe in 9 min. and by the hot water pipe in  $11\frac{1}{4}$  min. A person leaves the bath-room after turning on both pipes simultaneously, and returns at the moment when the bath should be filled. Finding, however, that the waste-pipe has been open, he now closes it. In  $3\frac{3}{4}$  min. more the bath is full. In what time would the waste-pipe empty it?
8. An estate is divided among 3 persons A, B, and C, so that A has  $\frac{5}{8}$  of the whole, and B twice as much as C. It is found that B has 27 ac. more than C. How large is the estate?
9. I took a risk at  $13\frac{1}{2}\%$ , re-insured  $\frac{2}{5}$  of it at 2 %, and  $\frac{1}{4}$  of it at  $2\frac{1}{2}\%$ . What rate of insurance do I get on what is left?

## 62 PRACTICAL PROBLEMS IN ARITHMETIC.

1. An English Imperial gallon is a measure which will hold 10 lb. avoirdupois of pure water. A cubic foot of pure water weighs 997.137 oz. avoirdupois. The French litre is a cubic decimeter, that is, a cube on a side of 3.937 in. Find to two places of decimals how many litres there are in a gallon.

2. Simplify  $\frac{1}{4} \text{ of } \frac{1}{4} \text{ of } \frac{1}{4} \text{ of } \text{ £}3 \frac{3}{4} + 6\frac{2}{3} \text{ of } \text{ £}3 \text{ 0s. 9d.} - 4\frac{1}{3} \text{ of } \text{ £}3 \text{ 2s.}$

3. A floor is 27.3 ft. long and 20.16 ft. wide. What will be the cost of covering it with matting 2.4 ft. wide at 60c. a yard?

4. The external dimensions of a box (with a lid) are as follows: Length 2 ft., width  $1\frac{1}{2}$  ft., height 1 ft. How many cubic inches of air are there in it, if the walls of the box are  $1\frac{1}{2}$  in. thick?

5. Simplify:

$$\left( \frac{\frac{5}{4} - \frac{3}{7} \text{ of } 1.53 + 2\frac{2}{5} \div 1\frac{1}{5}}{\frac{3}{4} \text{ of } 7\frac{3}{4} - 5\frac{3}{5} \div 3\frac{4}{5}} \right) \times \frac{(0.00185)^2}{(18.5)^2} \times \frac{\frac{1}{2} + \frac{1}{3} + \frac{1}{4}}{\frac{1}{2} + \frac{1}{3} + \frac{1}{4}} \\ \sqrt{\frac{(0.78) \times (0.00004)}{(0.013) \times (0.015)}}$$

6. A laborer contracts to work 80 dy. for 75c. a day, and to forfeit 50c. for every day he was idle during that time. He received \$25. How many days did he work?

7. How much corn at 42c., 60c., 67c., and 78c. per bushel must be mixed together, that the compound may be worth 64c. per bushel?

8. What is the eighth root of 722204136308736?

**MISCELLANEOUS.**

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1. A man got his note for \$1200 at 90 dy. discounted at 6%, and lent the proceeds for a year at 7%. By renewing every 90 dy., paying discount, he kept his note in the bank the whole year. How much was gained in the year by this operation?
2. What amount must be invested in 3% stock, which sells at 92 $\frac{1}{2}$ , to found a scholarship of \$200 a year?
3. The total valuation of the property in a school district is \$300000, and the amount to be raised by assessment for school purposes is \$201. What is the rate in the dollar and what will John Smith have to pay if his property in the district is valued at \$2750?
4. *A* and *B* are partners in business. *A*'s stock is to *B*'s as 7 is to 11. After 3 mo. *A* withdraws  $\frac{2}{3}$  of his stock and *B*  $\frac{3}{4}$  of his. How shall the year's gains of \$4662 be divided?
5. Simplify  $(.477 \times .25) \div .001219$ .
6. Standard gold contains 12 parts of pure gold to 1 part of copper, and 20 lb. troy are coined into 934 $\frac{1}{2}$  sovereigns. Find the weight of pure gold in a sovereign.
7. Sold wheat at \$1 per bushel and gained \$30 on the quantity sold; had I sold it at \$1.12 $\frac{1}{2}$  I would have gained \$42 on quantity sold. How many bushels did I sell?
8. How many men must be employed to mow 100 ac. 32 ro. in 1 $\frac{1}{2}$  dy., if 21 men can mow 72 ac. in 5 dy.?

## 64 PRACTICAL PROBLEMS IN ARITHMETIC.

1. The true discount on \$572 for one year is \$22. What is the rate of interest?
2. If I transfer \$3294 of  $3\frac{1}{2}\%$  stock to the 3 per cents, selling the former at  $98\frac{1}{2}$  and purchasing the latter at  $91\frac{1}{2}$ , what do I gain or lose by the transaction?
3. Three workman, *A*, *B*, *C*, did a certain work, and were paid daily wages according to their skill. *A*'s efficiency was to *B*'s as 4 to 3; *B*'s to *C*'s as 6 to 5. *A* worked 5 dy., *B* 6 dy., and *C* 8 dy., and the whole amount paid for the work was \$36.25. Find what each man receives daily.
4. Find the value of  

$$\frac{2}{5}(6\frac{2}{3} + 2\frac{1}{2}) \text{ of } £1 + \frac{2\frac{1}{4} - \frac{3}{8} \text{ of } 1\frac{5}{6}}{\frac{1}{5} \text{ of } 3\frac{1}{3} + \frac{1}{3} \frac{3}{6}} \text{ of } \frac{1}{2}\frac{2}{3} \text{ of a crown.}$$
 Express the answer in Canadian currency.
5. If the People's Bank stock sells at 147 and pays a yearly dividend of 7%, and the Merchants' Bank stock sells at 150 and pays a yearly dividend of 8%, what will be the difference between the annual incomes which *A* will receive if he invests \$5000 in the stock of each bank?
6. Find the value of  

$$\frac{£1.15 + 2.0625 \text{ guineas} + .0078125 \text{ of } 32s.}{3}$$
7. What sum must be put out at 5%, compound interest, to amount to \$2000 in 4 yr.?
8. Explain the difference between true and bank discount.
9. Simplify  $\frac{(2\frac{3}{4} + 3\frac{4}{7}) \times (8\frac{4}{5} - 4\frac{1}{2})}{2\frac{2}{3} + (3\frac{1}{7} \times 8\frac{1}{5}) - 4\frac{1}{2}} \times .214285\frac{7}{9}.$

## PRACTICAL PROBLEMS IN ARITHMETIC. 65

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1. I exchange an estate, whose value is £25434 16s. 8d. stg., for stock whose present value is \$76200.54, and the following shares in ships:  $\frac{1}{5}$  of one whose whole value is £8234 18s. 4d. stg., and  $\frac{3}{5}$  of another whose whole value is \$9999. How much would I lose or gain by the transaction? Express the answer in dollars and cents.

2. *A* can do a piece of work in 25 dy., *B* can do it in 20 dy., and *C* in 24 dy. The three work together for 2 dy., and then *A* and *B* leave; but *C* continues, and after  $8\frac{3}{5}$  dy. is rejoined by *A*, who brings *D* along with him, and these three finish the remainder of the work in 3 dy. more. In what time would *D* alone have done the whole work?

3. Multiply the product of .428571 and .0875 by .571428, and divide the result by .00425.

4. If 60 yd. of carpet, 2 ft. 6 in. wide, be bought at 3s. 4d. a yard, to cover a room 21 ft. 9 in. long and 14 ft. 8 in. wide, and the remnart be sold for 2s. 6d. a yard, how much will it cost to carpet the room?

5. I spent .04 + \$40 of my income, and found that  $\frac{1}{36}$  of the remainder was \$8 $\frac{5}{9}$ . Find my income.

6. Simplify:

$$\frac{\left\{ \frac{5}{9} \text{ of } 13\frac{1}{2} \div \frac{\frac{2}{9} \text{ of } 7\frac{1}{2}}{8\frac{1}{2}} \right\} + \left\{ \frac{2}{3} \text{ of } \frac{7}{8} - \frac{1}{4} \text{ of } \frac{5}{16} \right\}}{\left( \frac{4}{5} \text{ of } 9\frac{33}{10} \right) + 6\frac{1}{2} + \frac{11}{1\frac{1}{4}} - 6\frac{1}{10} + \frac{1}{1\frac{1}{8}} - 1\frac{1}{4}} \times 36288 \times 109455.$$

7. I sent ten thousand and ninety-six dollars to a Winnipeg commission merchant to purchase flour. How many barrels could he buy at 4c. a pound, after deducting his commission at 2%?

## 66 PRACTICAL PROBLEMS IN ARITHMETIC.

1. A person has \$1000 in the  $3\frac{1}{2}$  per cents. How much must he also have in the 3 per cents that his whole income may be \$200, and what sum would he realize by selling out at  $83\frac{5}{8}$  and  $77\frac{1}{2}$  respectively?
2. If 10 sq. chains make an acre, what is the length of a link in inches?
3. If 5 men reap a field in  $3\frac{1}{2}$  dy., working 12 hr. per day, how long would 6 boys and 9 girls take to reap a field double the size, working 10 hr. per day, each man doing in 1 hr. twice as much as a boy and three times as much as a girl?
4. Which is the heavier—a pound of gold or a pound of feathers, and an ounce of gold or an ounce of feathers? By how much in each case?
5. Simplify:
$$\left\{ \frac{1 + \frac{3}{5 + \frac{2}{3 + \frac{1}{2}}}}{2 - \frac{\frac{1}{2}}{2 + \frac{1}{3 + \frac{1}{2}}}} \times \sqrt{.000729} \right\} \times \frac{\frac{6\frac{1}{2} + 1\frac{3}{8} - 4\frac{1}{9} - 1\frac{7}{8}}{1\frac{1}{9} + \frac{1}{2} + \frac{1}{12\frac{6}{7}}}}{\sqrt{.0062001}}$$
6. Find the cube root of  $7\frac{3}{5}$  to three places of decimals.
7. The specific gravity of atmospheric air, compared with water, is .0012; the specific gravity of common gas, compared with air, is .45. Find the specific gravity of common gas compared with water.
8. An army of 215296 men is drawn up in the form of a solid square. How many men are there on each side?
9. A detachment of soldiers are drawn up two deep, so as to form a hollow square. How many men are there if the face of one side of the square shows 10 men?

## PRACTICAL PROBLEMS IN ARITHMETIC. 67

1. Simplify  $\frac{.301\bar{0} \times .708\bar{3}}{2\frac{2}{7}\frac{6}{5} \div 1\frac{3}{8}\frac{1}{5}} \times \frac{2.25 \times .03\bar{7}}{.23\bar{1}\bar{7}}$   
 $\frac{2.25 \times .03\bar{7}}{1.158}.$
2. Express in Arabic notation CXIV, and in Roman notation 11983.
3. What is the least common multiple of 7, 15, 21, 28, 37, 100, and 125?
4. Find the cube root of (a)  $1242\frac{1}{4}\frac{3}{4}$ , (b)  $3\frac{1}{4}\frac{3}{4}$ , (c)  $7558\frac{1}{5}\frac{7}{12}$ .
5. Find the area of a decagon, each of whose sides is 25 rd.
6. If the sun be 1000000 times as large as the earth, and the earth 8000 miles in diameter, what is the diameter of the sun?
7. Find the value of  
 $2\frac{1}{5} \times \frac{\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6}}{\left(\frac{2}{3} \text{ of } \frac{4}{5}\right) - \left(\frac{2}{3} \text{ of } \frac{1}{2}\right)} \times \left(1\frac{1}{3} + \frac{2}{3} \text{ of } \frac{4}{3} + \frac{4}{5}\frac{1}{10}\right) \times \frac{62}{5}\frac{5}{12}$
8. Compose a problem of which the solution may be as follows: £63 - £50 8s. = £12 12s. gain per hogshead. Then £50 8s. : £12 12s. :: 100 : £25, gain per cent.
9. What is the cost of 3 bu. 1 pk. 5 qt. of berries at 15c. a quart?
10. How much will an auctioneer receive for selling a piano for \$450, and furniture for \$350, at  $6\frac{1}{4}\%$  commission?
11. Find the sum of 6 and 428 thousandths, 23 and 73 hundredths, 18 and 456 thousandths, and 15 and 907 thousandths.

## 68 PRACTICAL PROBLEMS IN ARITHMETIC.

1. Two men, *A* and *B*, hire a pasture for \$91.05; *A* puts in 450 sheep for 7 wk., and *B* 365 sheep for 8 wk. What should each pay?
2. A debt of \$53.95 was due May 21st, 1880, but was settled November 9th, 1874, at a discount of 6 %. How much money was paid?
3. Find the value of  

$$8 \div 28 \times 40 \times 8 \times 56 \times 12.82561 \div .0949416 \div 1.326$$

$$(\frac{13}{15} - \frac{17}{20}) \times .625 \times 3.01 \div \frac{7}{8} \times \frac{7}{8} \times \frac{15}{16} \times \frac{1}{11} \times \frac{4}{5}$$
4. Find the face of a sight draft costing \$56.40, when exchange is  $2\frac{1}{8}$  % premium.
5. Find the side of a square field equal in area to a rectangular field 676 yd. long by 256 yd. wide.
6. I rented a house for 7 % of its value, and in 9 mo. 18 dy. I received \$122.08 rent. Find the value of the house.
7. Write out a problem of which the solution is as follows:  

$$100\% - 20\% = 80\% \text{ left. } 80\% \times 140\% = 112\%$$

$$112\% - 100\% = 12\% \text{ gain.}$$
8. A boy sold  $\frac{2}{3}$  bu.  $\frac{2}{5}$  pk.  $\frac{7}{9}$  qt.  $\frac{2}{3}$  pt. of berries at 5c. a pint, and with the proceeds bought sugar at  $3\frac{1}{2}$ c. a pound. How much sugar did he get?
9. Three men enter into partnership. *A* puts in \$4000 for 8 mo., *B* \$6000 for 7 mo., and *C* \$3500 for 1 yr. They gain \$2320. Divide the gains.
10. A person owning 10 shares of 3 % stock sells it at \$74 per share. With part of the proceeds he buys enough 5 % stock at 105 to yield the same income. How much money had he remaining?

## PRACTICAL PROBLEMS IN ARITHMETIC. 69

1. A room is 16 ft. long, 14 ft. wide, and 10 ft. high; it has 3 windows 6 ft. by 3 ft. 3 in., 2 doors 7 ft. by 3 ft., and the baseboard is 9 in. wide. Find the cost of plastering the room at 15c. per square yard.

2. Reduce 3 wk. 4 dy. 20 hr. 6 min. to the decimal of 60 days, and multiply the result by  $\frac{2\frac{3}{4} \times 7\frac{7}{11}}{4 \times 3 \times 18\frac{2}{3}}$ .

3. Find the cost of lining a tank 14 ft. long, 7 ft. deep, 9 ft. wide, with zinc at 40c. per square yard.

4. Simplify:

$$\frac{\frac{1}{2} + .25 + \frac{3}{8} - .12\frac{1}{2} + \frac{1}{5} + \frac{3}{10} + .162\frac{1}{3} + \frac{1}{3} - \frac{7}{10} + .2}{\left\{ \frac{1}{2} \text{ of } 3\frac{1}{2} + (.03\frac{1}{2} - .0875 + 8\frac{1}{3}) \right\} \div \frac{\frac{2}{3} + \frac{4}{5}}{\frac{2}{3} \text{ of } 3 - \frac{11}{7\frac{1}{3}}}}$$

5. Add together eighty-four million and fifteen; sixty-seven thousand and sixty-eight hundred thousandths; five million and ten thousand seventeen millionths; three hundred thousand twenty-hundredths; nine million and twenty-seven. Write the answer in words.

6. Write a note, using the following data: Date, January 15th, 1902; principal \$650; time 6 mo. 4 dy.; interest 5%.

7. If grain sacks sell at \$1.50 per dozen, what will it cost for the number of sacks necessary to hold 2 bu. 1 pk. 4 qt. of grain, if each sack holds 2 bu. 1 pk. 3 qt.?

8. Write out the problem of which the following is the solution: First, £114 8s. 4d.  $\div$  8 = £572 1s. 8d.  $\div$  8 = £71 10s. 2 $\frac{1}{2}$ d., A's share; then £114 8s. 4d.  $\div$  4 = £28 12s. 1d., B's share; and £114 8s. 4d.  $\div$  8 = £14 6s. 0 $\frac{1}{2}$ d., C's share.

## 70 PRACTICAL PROBLEMS IN ARITHMETIC.

1. (a) Multiply 334.5763 by 47.5; (b) subtract 5.6 from 74.5283; (c) divide 27.654 by 16.6.

2. (a) Find square root of 1020304030201; (b) find cubic root of 41063625.

3. Simplify:

$$\frac{\frac{1}{2} \text{ of } 4 \div \frac{2}{3} \text{ of } \frac{5}{6} \times (\frac{1}{2} + \frac{7}{9} + \frac{3}{4}) : (\frac{2}{3} + 4\frac{1}{2} + \frac{1}{2} \text{ of } \frac{4}{7})}{456\frac{1}{2} \div 3\frac{1}{2} \quad \frac{3\frac{1}{2} \times 2\frac{9}{10} \times 1\frac{1}{2}}{(3 \text{ of } \frac{2}{3} - \frac{1}{2} \text{ of } \frac{5}{6}) \div (14\frac{1}{4} \times 4\frac{1}{6})}}$$

and reduce the answer to five places of decimals.

4. Find the compound interest on £500 for 3 yr. at 4%.

5. In the sentence, "Of all the saws that ever I saw saw, I never saw a saw saw as my saw saws," what percentage of the letters are consonants, what percentage of the words are nouns, and by how much per cent. do the total number of the letters in the verbs exceed the total number of the letters in the nouns?

6. How does a square differ from a cube? A sphere from a circle? An angle from a triangle? A pyramid from a cone? A cylinder from a prism?

7. The market price of an article is \$2.50. The merchant allows a discount of 20%, and still makes a profit of 33 $\frac{1}{3}$ %. What did the dealer pay for the article?

8. A merchant bought 460 bbl. of flour at \$3.75 per barrel. He sent the flour to an agent, who sold it at an advance of 6 $\frac{1}{2}$ % and charged  $\frac{1}{2}$ % commission. The merchant then sent the net proceeds to an agent to purchase molasses, after deducting a commission of 1 $\frac{1}{4}$ %. How many gallons, at 60c., could the agent purchase?

9. If 200 men in 12 dy. of 8 hr. each can dig a trench 160 yd. long, 18 ft. wide, and 4 yd. deep, in how many days of 10 hr. each will 90 men dig a trench 1350 ft. long, 4 yd. wide, and 3 yd. deep?

## PRACTICAL PROBLEMS IN ARITHMETIC. 71

1. Give rule or formula for finding percentage when base and rate are given; for finding rate when base and amount are given.
2. Find the values of  $3.375 \times 1.6 \times 4.8$ ;  $11.73 - 10.916$ ;  $3.375 \div 4.5$ ;  $3.5 + 2.83 + .6 + 1.179$ ; and find the product of the results.
3. Express .375 of a guinea +  $\frac{3}{4}$  of a crown + .3 of 7s. 6d. -  $\frac{3}{4}$  of 2d. as the decimal of 16s.
4. Find the square root of 3, 16,353936, 111,259,3510, and .005.
5. Divide £119 among 16 men, 32 women, and 48 children, so that each man's share will equal the shares of 2 women, and the 32 women will receive twice as much as the 48 children.
6. Find two numbers, such that their sum is 51 and their difference 15.
7. At the Cambridge local examinations the number of junior students who presented themselves at the 24 centres for examination in mathematics gave a certain average percentage, and this average is diminished by  $2\frac{1}{4}$  if London, and the 95 students which it furnished, be omitted. How many were there in all?
8. At 1 o'clock the minute-hand is 5 min. behind the hour-hand. In how many minutes will it be the same distance in front?
9. Find the cubic root of .01, 33076.161, 80677568161, and 2.5.
10. Simplify:

$$\frac{\left\{ 2\frac{3}{4} + \frac{5}{2} \text{ of } \frac{7}{3\frac{1}{2}} - 2\frac{1}{2} \right\} \div \left\{ 3\frac{4}{5} + \frac{2}{10\frac{1}{2}} - \frac{5}{18} \text{ of } \frac{4}{7} \right\}}{\left\{ \frac{1}{1\frac{1}{2}} \text{ of } \frac{1}{1 + \frac{1}{3}} \right\} \div \left\{ \frac{\frac{1}{2} + \frac{1}{3} + \frac{1}{4}}{1\frac{1}{2} + 3\frac{1}{2} + 4\frac{1}{2}} \right\}} \times 1\frac{7}{228}$$

## 72 PRACTICAL PROBLEMS IN ARITHMETIC.

1. If 1 oz. 4 dwt. 9 gr. cost £1 11s. 0½d., what is the price of 5 oz. 17 dwt.?

### PROPORTION.

2. If in 20.16 dy. of  $11\frac{1}{2}$  hr. each, 12 men build a wall 126 ft. long, 28 ft. high, and  $1\frac{1}{2}$  ft. thick, in how many days of 12 hr. each will 9 men build a wall 96 ft. long, 21 ft. high, and  $1\frac{1}{4}$  ft. thick?

3. The tax to be raised in a town is \$16875, and the assessed valuation of the property is \$1500000. What amount of tax will a man have to pay whose property is assessed at \$6500?

4. *A* and *B* can plough  $22\frac{1}{2}$  ac. of land in 3 dy.; *B* and *C* can plough 6 ac. in 1 dy., and *A* and *C* 13 ac. in 2 dy. How many acres can each plough per day?

5. If *A* can do a piece of work by himself in 1 hr., *B* in 3 hr., *C* in 5 hr., and *D* in 7 hr., in what time can they do three times as much, all working together?

6. If 120 men, in 3 dy. of 12 hr. each, can dig a trench 30 yd. long, 2 ft. broad, and 4 ft. deep, how many men would be required to dig a trench 50 yd. long, 6 ft. deep, and  $4\frac{1}{2}$  ft. broad in 9 dy. of 15 hr.?

7. A tract of land 7495 ac. 3 ro. 32 rd. is to be divided among a regiment consisting of a colonel, a major, 5 captains, 9 lieutenants, 6 ensigns, 20 sergeants, and 450 privates, so that a sergeant is to have twice as much as a private, an ensign 8 shares, a lieutenant 12, a captain 20, the major 30, and the colonel 50. Find the share of each and the value of the land at \$3 an acre.

## PRACTICAL PROBLEMS IN ARITHMETIC. 73

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1. *A* alone could perform a piece of work in 12 hr.; *A* and *C* together could do it in 5 hr., and *C*'s work is to *B*'s as 2 is to 3. The work must be completed by noon. *A* begins work at 5 a.m. At what hour must *B* and *C* join him so that the work may be completed in time?

2. If 4 men and 18 boys working together can do three times as much work per day as 2 men and 4 boys together, compare the work of a boy with that of a man.

3. If battleship having 1800 men on board and provisions enough for  $1\frac{1}{2}$  yr., should lose  $\frac{1}{4}$  of her men, how long would the provisions last the remainder?

4. If 15 men, working 6 hr. 40 min. per day, can dig a trench 48 ft. long, 8 ft. wide, and 3 ft. deep in 12 dy., how many hours a day must 25 men work to dig a trench 36 ft. long, 12 ft. wide, and 3 ft. deep?

### INTEREST AND PERCENTAGE.

5. A sum of money amounts in 10 yr. at 7% to \$2898.50. In how many years will it amount to \$3733.95?

6. If by selling goods for \$670.80 I lose 14%, how much per cent. should I have lost or gained if I had sold them for \$707.20?

7. What sum put out at 5%, simple interest, will amount to \$884.50 in  $3\frac{1}{5}$  yr.?

8. If  $3\frac{1}{2}$ % would be gained by selling 714 qr. of wheat for \$8867.88, at what price per quarter must it be sold to realize a gain of  $4\frac{1}{2}$ %?

9. A savings bank pays  $3\frac{1}{2}$ % on deposits that remain 6 mo., interest payable semi-annually. At the end of 2 yr. what amount is due a person who has deposited \$25 at the beginning of each interest period?

## 74 PRACTICAL PROBLEMS IN ARITHMETIC.

1. A merchant bought goods and sold them for \$4200, losing 16 %. What did the goods cost him?
2. Find the compound interest on \$1000 for 2 yr. at  $3\frac{1}{2}\%$ , payable quarterly.
3. What is the amount of \$600 for  $16\frac{2}{3}$  yr. at 6 % simple interest?
4. A note for \$2500, dated July 1st, 1898, was to be paid October 2nd, 1900, with compound interest at 6 %. Find the amount to be paid October 2nd.
5. \$1800. Annandale, September 10th, 1900.  
For value received, I promise to pay Patrick Rice, or order, Eighteen Hundred Dollars  $\frac{9}{100}$  in one year, with interest at 6 %. C. O. Howlett.  
A payment of \$600 was made on January 25th, 1902. What was the balance due July 15th, 1902?
6. I hold a note for \$3600, the interest on which from its date to October 29th, 1890, at 7 % amounts to \$1438.50. Find the date of the note?
7. Find the simple interest on 17000 eagles, at 6 %, for  $3\frac{5}{12}$  yr.
8. A Cardigan merchant bought dry goods to the amount of \$1300 for cash; he kept them for  $1\frac{2}{3}$  yr. and then sold them for 15 % advance on their cost, at 4 mo. credit. Find his profit, interest 6 %.

### FRACTIONS.

- 9. Simplify:

$$\frac{\left( \frac{1\frac{1}{2} - 1\frac{1}{4}}{1\frac{1}{2} \times 1\frac{1}{4}} \right) : \left( \frac{4\frac{4}{5} + 3\frac{3}{5}}{6\frac{1}{10} \div 1\frac{1}{4}} \right)}{\left( \frac{1}{12} \text{ of } 1\frac{3}{4} \right) \div \left( \left( \frac{1}{4} - \frac{1}{10} \right) + \left( \frac{1}{5} \times 1\frac{1}{20} \right) \right)} \times 7\frac{1}{15}.$$

## PRACTICAL PROBLEMS IN ARITHMETIC. 75

1. Express as a decimal:

$$\frac{60}{59\frac{1}{2}} = \frac{1}{2\frac{1}{3}\frac{1}{9}}$$

$$\frac{1 + \left( \frac{1}{2\frac{1}{3}\frac{1}{9}} \text{ of } \frac{60}{59\frac{1}{2}} \right)}{\frac{4\frac{5}{9}}{2\frac{1}{3}}}$$

2. Divide the sum of  $4\frac{5}{9}$ ,  $7\frac{3}{6}$ ,  $3\frac{7}{12}$  by the difference between  $1\frac{7}{8}$  and  $3\frac{5}{6}$ , and multiply the result by  $7\frac{1}{2}$ .

3. Simplify:

$$\frac{\left( .5 + \frac{3\frac{1}{2}}{14} \right) \times \left( \frac{10}{26\frac{2}{3}} - \frac{8\frac{1}{2}}{17} \right)}{\left( 1 + \frac{8\frac{1}{2}}{36} + .375 + .5 \right) \times 6.2\frac{1}{2}} \times .00625$$

4. Simplify:

$$\frac{\left( .789 - .789 \right)}{\frac{\left( .75 - .075 \times .75 \text{ of } 8 \right)}{118\frac{1}{4}} \div .00096}$$

$.04\frac{1}{2}$

5. Multiply  $7.36$  by  $3.29\frac{1}{7}$  and express the answer as a decimal fraction.

6. Simplify:

$$\frac{3\frac{1}{2} + 4\frac{1}{3} - \left( 4\frac{1}{4} \div 3\frac{2}{5} \right)}{3 + \frac{1}{5 + \frac{1}{7}}} \times .14285\bar{7}$$

7. If the difference between  $75$  and  $\frac{2}{7}$  of  $121\frac{4}{5} + \frac{3}{4}$  of  $48\frac{2}{3}$  be taken from  $150\frac{1}{2}$ , by how many times  $\frac{4}{5}$  of  $1\frac{1}{8}$  of  $4 - 2\frac{1}{4}$  should the result be multiplied to produce  $342\frac{63}{100} \frac{2}{7}$ ?

8. Find the value of

$$\frac{\left( 1\frac{1}{5} - \frac{1}{8} \right) \times \left( \frac{1}{4} - \frac{1}{10} \right) \div \frac{1}{2} \text{ of } 1\frac{1}{3}}{\frac{\frac{3}{4} \text{ of } 4\frac{1}{5} \text{ of } \frac{4}{7}}{\left( 2\frac{2}{3} + 3\frac{4}{7} \right) \times \left( 8\frac{4}{5} - 4\frac{1}{2} \right)} - \frac{2}{2\frac{2}{3} + \left( 3\frac{1}{7} \times 8\frac{4}{5} \right) - 4\frac{1}{2}}} \times \frac{1}{21\frac{3}{5} + \frac{1}{8} - 2\frac{1}{10} + \frac{1}{12}}$$

## 76 PRACTICAL PROBLEMS IN ARITHMETIC.

1. If  $\frac{1}{7}$  of  $2\frac{1}{4} - (\frac{2}{3} \text{ of } 1\frac{5}{6})$   
 $(\frac{1}{5} \text{ of } 3\frac{1}{2}) + \frac{1}{3}\frac{3}{6}$  of  $1\frac{2}{11}$  of an estate cost \$1000  
what will  $(4\frac{7}{10} \times 5.81) \div 2.5$   
 $4\frac{7}{10}$  of  $32 \text{ of } .45$  cost?

### PRESENT WORTH AND DISCOUNT.

2. A merchant bought a quantity of goods for \$227.92, payable 12 mo. hence, and sold them at once for \$275.56, payable 9 mo. hence. Find the cash gain, bank discount being  $4\frac{1}{2}\%$ .
3. Find the true discount on a bill of \$5000 paid 210 dy. before it is due, at  $4\frac{1}{2}\%$ .
4. A bill of \$3327.50 drawn on January 1st, 1901, at 8 mo. is discounted by a banker on the 11th April following at 4%. What does the banker gain by deducting interest instead of true discount?
5. Find the present worth of a note of \$36.86 due 80 dy. hence at  $4\frac{1}{2}\%$ .
6. A bill of \$825 was drawn on October 24th, 1901, at 6 mo., and on January 4th, 1902, was discounted at  $6\frac{1}{4}\%$ . Find the present worth of it.
7. Find the true discount on a bill of \$5100, discounted 146 dy. before being due, at 5%.
8. A merchant bought 500 bbl. flour at \$6.50 per barrel and sold it immediately at \$7.25 per barrel, receiving in payment a note due 3 mo. hence, which he had discounted at a bank at 6%. What did he gain on the flour?
9. If \$22 is the true discount on \$572 for one year, what is the rate of interest?

## PRACTICAL PROBLEMS IN ARITHMETIC. 77

1. A bill for \$6900 drawn on January 1st was presented for payment 3 dy. afterwards. Find the present worth, money being worth 4 %.
2. Find the present worth of \$200 due 6 mo. hence at 5 %.
3. A Georgetown merchant gave for 4 carcasses of pork a bill of \$73 due in 1 mo., and sold the pork at once for a note of \$87 at 4 mo. Find the merchant's gain or loss per cent., interest at  $4\frac{1}{2}\%$ .
4. Show that the difference between the interest and the true discount on the same sum is the interest on the discount.
5. Find the amount which a banker gains by discounting a bill of \$2451.55, drawn July 12th at 4 mo. and discounted September 3rd, at 5 % per year.
6. A person discounted a bill at the Bank of Halifax and received \$37.10 less than the face of the bill. If true discount only were collected, what should he receive for his bill, interest at 5 %?

### STOCKS.

7. At what price must I buy 3 per cent. stock so that after paying an income tax of  $6\frac{2}{3}\%$  I may have a net income of 4 % on my outlay?
8. I invest \$230 for 3 yr. at 7 % and then buy bank stock, 12 per cents, at  $114\frac{1}{2}$ . How much stock do I get?
9. The income of a railway company would pay 4 % dividend were there no preference shares; but \$200000 of the stock being of such shares and guaranteed 5 %, the ordinary shareholders receive only  $3\frac{1}{2}\%$ . What is the whole amount of stock?

## 78 PRACTICAL PROBLEMS IN ARITHMETIC.

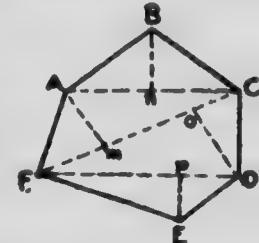
1. Find the change in income by selling out \$20000 in the 3 per cents at 90 and investing in 4 per cents at 115.
2. A Halifax broker invested a certain sum in  $5\frac{1}{2}$  per cents at 98. After receiving a half-year's dividend upon it he sold out at 102. The whole increase of capital is \$135. What was the original sum invested?
3. I invest \$540 in 6 per cent. stock at  $93\frac{1}{4}$ , commission  $\frac{1}{8}\%$ . How much stock do I receive?
4. What sum must be invested in 4 per cent. stock at 96 in order that, after paying an income tax of 4c. on the dollar, I may have an income of \$400?
5. William Wightman invested \$11875 in bank stock yielding  $5\frac{1}{2}\%$ . He sells out at 96, and invests  $\frac{1}{3}$  of the proceeds in 4 per cent. stock at 76 and the remainder in  $6\frac{1}{2}$  per cents at 114. What is the alteration in his income?
6. A speculator invested a certain sum in the  $5\frac{1}{2}$  per cents at  $94\frac{5}{8}$ . After receiving a year's dividend he sells out at  $89\frac{1}{2}$ . The whole increase on his capital is \$122. What did he invest?
7. A person holding £1500 sterling stock in 3 per cents at 98, transfers to Canadian stock, 6 per cents, at 105. Find the gain in income if £1 = \$4.87.
8. I invest \$19000 in the 5 per cents at 95. How much must I also invest in the 6 per cents at 120 that my income may be \$1750?
9. A invests  $\frac{1}{3}$  of his fortune in the 5 per cents at 95 and receives therefrom an annual dividend of \$1900. He invests the remainder of his fortune in the 6 per cents, and derives thence an income of \$3800. At what price was the latter stock purchased?

**MENSURATION.**

1. What is the difference between 8 sq. ft. and 8 ft. square? The difference in area between 1 sq. ft. and 1 ft. square?
2. Three circles, each 40 rd. in diameter, touch each other externally. What is the area of the space enclosed between the circles?
3. Find the cost of paving a rectangular courtyard whose length is 63 ft. and width 45 ft., it being paved with pebbles at 1s. 9d. per square yard, except a foot-path which runs the whole length, 5 ft. 3 in. broad, and which is paved with flagstones at 3s. per square yard. The bill to be paid in Canadian currency.
4. Find the cost of having a ditch dug round a garden  $136\frac{1}{2}$  yd. long and  $72\frac{3}{4}$  yd. wide, the ditch being 4 ft. deep and  $2\frac{1}{2}$  ft. wide, and costing 2c. per cubic foot.
5. Thirty-two yards of carpet,  $2\frac{2}{3}$  ft. wide, are used in making a square rug which is laid evenly in the centre of a rectangular room 24 ft. by  $18\frac{1}{2}$  ft. Find the distance the carpet is from the sides of the room, and what is the area of the uncovered portion of the floor?
6. A room is 21 ft. long, 15 ft. 6 in. wide, 10 ft. high; it contains 3 windows, the recesses of which reach to the ceiling, and are 4 ft. 6 in. wide; there are in it 4 doors, each 6 ft. 6 in. high and 3 ft. 3 in. wide; the fireplace is 6 ft. wide and 4 ft. high; a skirting 1 ft. 8 in. deep runs round the walls. Find the cost of papering the room at 5c. per square foot.
7. Find the area of a square whose side is 17.625 ch.
8. What is the area of a triangle whose base is 12.6 ch. and altitude 6.4 ch.?

## 80 PRACTICAL PROBLEMS IN ARITHMETIC.

1. How many acres are there in a triangular field whose three sides are  $49$ ,  $50\frac{1}{4}$ , and  $25\frac{6}{5}$  ch.?
2. If the base of a right-angled triangle is  $58$  and the perpendicular  $35$  ft., find the hypotenuse.
3. Find the area of a trapezium whose diagonal is  $108\frac{1}{2}$  ft. and the perpendiculars  $56\frac{1}{2}$  ft. and  $60\frac{3}{4}$  ft.
4. The parallel sides of a trapezoid are  $12.41$  and  $8.22$  ch., also the perpendicular is  $5.15$  ch. Find the area.
5. Find the area of a hexagon whose side is  $14.6$  ft. and perpendicular  $12.64$  ft.
6. Find the area of the figure  $A B C D E F$ , supposing the following dimensions are given:  $A C, 9\frac{1}{2}$ ;  $B n, 6\frac{2}{5}$ ;  $F C, 13\frac{3}{4}$ ;  $A m, 4\frac{3}{4}$ ;  $D o, 7$ ;  $D F, 10$ ; and  $E p, 4$ .
7. The length of an irregular figure is  $50$  yd. and its breadths at seven equidistant places are  $5.5$ ,  $6.2$ ,  $7.3$ ,  $6$ ,  $7.5$ ,  $7$ , and  $8.6$ . What is its area?
8. The diameter of a circle is  $34$  ft. What is the length of the circumference?
9. Find the radius of a circle whose arc is  $1$  ro.
10. Find the area of a circle whose circumference is  $22$  ft.
11. The difference between the diameters of two concentric circles is  $5$ , the greater diameter being  $15$ . Find the area of the ring formed by the circles.
12. How many imperial gallons will a tank in the form of a cube contain if one side of the cube is  $7.5$  ft.?
13. What are the solid contents of a block of granite whose length is  $10$  ft., its width  $5\frac{3}{4}$  ft., and depth  $3\frac{1}{2}$  ft.?



## PRACTICAL PROBLEMS IN ARITHMETIC. 81

1. Find the solidity of a cylinder whose height is 15 ft. and circumference of its base 20 ft.
2. Find the solidity of a cone, the diameter of whose base is 18 in. and its altitude 15 ft.
3. Find the convex surface of a sphere whose diameter is 18 in.
4. Find the solid contents of a sphere whose radius is 18 ft.
5. What are the contents of two mahogany planks, each  $12\frac{1}{2}$  ft. long by 11 in. wide?
6. The length of a piece of squared timber is 49 ft. and its ends are equal squares whose sides are each 1.04 ft. What is the solidity?
7. The circumference of a tree in four different places is as follows: in the first place,  $3\frac{3}{4}$  ft.; second place,  $5\frac{1}{4}$  ft.; third place,  $4\frac{3}{4}$  ft.; fourth place,  $4\frac{5}{6}$  ft.; and the length of the tree is 15 ft. What is the solidity?
8. The weight of an iron shot used yearly at the Caledonian sports is 18 lb. What is its diameter? Another shot weighs 12 lb. What is its diameter?
9. The three sides of a triangle are 12, 20, and 28. What is the area?
10. Wishing to find the height of the flagpole on Annandale school lawn I procured a staff 5 ft. in length, and placing it in the sunshine, perpendicular to the horizon, I found its shadow to be 4.1 ft. Then I measured the shadow of the flagpole, which I found to be 43.46 ft. What was the length of the flagpole?
11. A tract of land in the form of an obtuse-angled triangle contains 1 ac.; two of the sides are 20 and 40 po. long. Find the third side.

## 82 PRACTICAL PROBLEMS IN ARITHMETIC.

1. If the linear side of a certain cube be increased 1 in. the surface of the cube will be increased 246 sq. in. Find the side of the cube.
2. Find the contents of a tree whose length is  $17\frac{3}{4}$  ft. and which girts in five different places as follows, viz.: in the first place, 9.43 ft.; in the second, 7.92; in the third, 6.15; in the fourth, 4.74; and in the fifth, 3.16.
3. A side wall of a house is 30 ft. high and the opposite wall 40 ft.; the roof forms a right angle at the top. The lengths of the rafters are 10 ft. and 12 ft.; the end of the shorter is placed on the higher wall and *vice versa*. Find the length of the upright which supports the ridge of the roof, and the width of the house.

### DECIMALS.

4. (a) Divide .05625 by .0275; (b) subtract 4.156 from 13.25; (c) multiply 4.03 by 17.27; (d) find the sum of the three answers.
5. Add the following numbers without using vulgar fractions:—3.09, 2.063, 3.216, 4.59, and 3.034.
6. Add together .5 of a pint,  $\frac{1}{2}$ -pk., 2 qt., .75 of 1 bu., 5 of a peck and  $\frac{1}{2}$ -pt.
7. Simplify:

$$\begin{array}{r}
 \text{.83 of 8s.} + \text{.05 of 2 guineas} + \text{1.8 of 5s.} \\
 \hline
 & 1 & .002 \\
 & \times & \times \\
 \frac{2}{5} & \times & \frac{7}{5} & \times & \frac{7}{500} \\
 & 1 & .0034 & \times & .007 \\
 & .08 & 25 & & 
 \end{array}$$

8. Divide  $\{(200 + .02 - \frac{1}{2}) \times .84 + (.84 - .12 \frac{3}{16} \times \frac{3}{4} \text{ of } 7\frac{1}{2})\}$  by .07 of  $\frac{5}{8} \times 300 \times .09\frac{3}{4}$ .

1. Simplify:

$$(347.84 \div 10.87) \times \{ (.0025 + .014) \times 50 \}$$

$$(1080 \times 3.27) \div 10.90 - (790 \div 3.95)$$

$$\times \left\{ 1\frac{3}{8} + \frac{1}{4} \text{ of } \frac{21}{11\frac{2}{3}} - \frac{5}{2\frac{1}{2}} \right\} : 2\frac{7}{11}$$

$$\frac{5\frac{1}{8} - 0.042 - 2.4 + 7\frac{5}{8}}{16\frac{2}{5} \div 60\frac{1}{2}} \times 32\frac{1}{74}$$

2. Find the value of

$$\frac{\sqrt{5.12} + \sqrt{.03375}}{\sqrt{80} - \sqrt{.01}} \times \frac{.0000665}{4.375}$$

3. Find the value of £.634375 + .025 of 25s. + .325 of 30s. - 2.145 of 5s. 8 $\frac{1}{2}$ d. divided by 4 $\frac{1}{2}$ .

4. Find the value of 3.1136 miles.

5. Simplify:

$$\frac{(.075 \times 0.075) - (0.005 \times 0.005)}{0.75 - 0.05} \times \sqrt{1383.0961}$$

### PROBLEMS RELATING TO WORK.

6. If *A* works for 9 hr. and *B* for 8 hr. a day, but *B* does in one hour  $\frac{1}{3}$  more work than *A*, in how many days of 9 hr. each will the two working together accomplish a task which would take *A* alone 6 dy. of 5 hr. each?

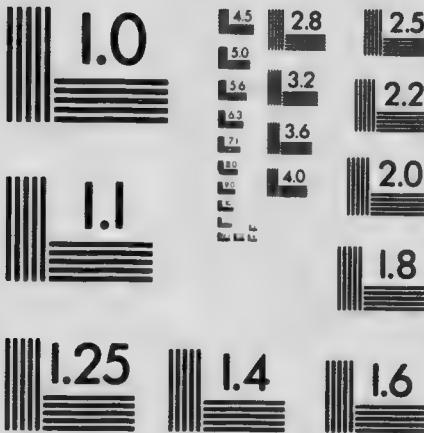
7. If *A* can do a piece of work in 5 dy., *B* twice as much in 7 dy., and *C* four times as much in 11 dy., in what time can *A*, *B*, and *C* together do three times the amount of work?

8. A boy hired with a farmer for 16 weeks for \$4 and a coat. At the end of 10 weeks the boy quits work and receives \$6.35 and the coat. Find the value of the coat.



# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc

1653 East Main Street  
Rochester, New York 14609 USA  
(716) 482 - 0300 - Phone  
(716) 288 - 5989 - Fax

## 84 PRACTICAL PROBLEMS IN ARITHMETIC.

1. What will it cost to paint a room  $20\frac{1}{2}$  ft. long,  $18\frac{1}{2}$  ft. wide, and 10 ft. high if there are two windows each 7 ft. by 4 ft., and the work costs  $62\frac{1}{2}$ c. per square yard?
2. *A* and *B* agree to do a piece of work for \$36; *A* could do it in 9 dy. and *B* in 12 dy.; but *C* joining them, the work is done in 4 dy. How should the money be divided?
3. If 15 men dig a trench 48 ft. long and  $2\frac{2}{3}$  yd. wide in  $14\frac{2}{5}$  dy., in how many days would 25 men dig a trench of the same depth, but 12 yd. long and 12 ft. wide?
4. Tom, Dick, and Harry, working together, can do a piece of work in 5 dy. Dick can do half as much as Tom and Harry together, and Harry can do  $\frac{1}{3}$  as much as Dick and Tom together. They receive \$45 for the work. What is each person's share?
5. Eight men were hired to do a certain work. By five of them failing to appear the work was prolonged  $4\frac{1}{4}$  dy. In what time could the eight men have done the work?
6. Write out a problem of which the following is the solution:  $12 \times 7\frac{1}{4}$  dy. = 87 dy. work to do;  $12 \times 5\frac{1}{2}$  dy. = 66 dy. work done;  $87 - 66 = 21$  dy. work to do by the 4 men;  $21 \div 4 = 5\frac{1}{4}$ ;  $5\frac{1}{2} - 5\frac{1}{4} = \frac{1}{4}$  dy. Answer.
7. If the rate of wages of a man, a woman, and a child be as 6, 3, and 1, and 25 men, 30 women, and 16 children get \$320 for 10 dy. work, find how much 32 men, 36 women, and 72 children should get for 8 dy. work.
8. *A*, *B*, and *C* mow a field for \$12. *A* mows as much as *B* and *C* less 5 ac., and *B* as much as *A* and *C* less 10 ac. If *A* receives \$5, how much should *B* and *C* each receive?

## PROFIT AND LOSS.

1. A dealer sold a carriage for \$76, and thereby cleared  $\frac{1}{4}$  of his money on it. If he had sold it for \$88 what would he have gained per cent.?
2. I bought cotton for 8 $\frac{1}{2}$ c. per yard, which was 20% less than the asking price, and the asking price was 12 $\frac{1}{2}$ % more than the cost. What did the merchant gain or lose on each yard he sold to me?
3. A schoolboy buys slate pencils at 5c. a dozen and sells them at the rate of 3 for 2c. What does he gain per cent.?
4. By selling 10 lb. of tea for \$5.40 I gain 12 $\frac{1}{2}$ %. What do I gain or lose per cent. by selling 25 lb. of the same tea for \$14.25?
5. A grocer mixes 68 lb. of tea at 32c. a pound with 36 lb. worth 28c. a pound. At what price must he sell the mixture to gain 13 $\frac{5}{13}$ c. a pound?
6. How much per cent. above cost must a man mark his goods so that he may take off 30% from the market price and still make 30% on the cost?
7. A buys a tract of land at \$42 an acre. If he sells  $\frac{1}{4}$  of it to *B* at \$21 an acre,  $\frac{1}{5}$  of the remainder to *C* at \$63 an acre,  $\frac{1}{8}$  of what then remains to *D* at \$12.75 for  $\frac{1}{4}$  of an acre, and the remainder,  $19\frac{7}{16}$  ac., to *E* at \$72 for  $\frac{8}{9}$  of an acre, what is his gain or loss?
8. A man bought a farm of 165 ac. 2 ro. 32 po. for a certain sum and sold it immediately at \$33.50 per acre, and took a note for the amount, payable in 5 mo. 15 dy. at 7% simple interest. He got the note discounted at once. How much money did he make on the transaction if he bought the farm for \$4986?

## 86 PRACTICAL PROBLEMS IN ARITHMETIC.

1. The 4 per cents are selling at 136 and the 3 per cents at 102. How much would I gain or lose in income by selling out \$3400 stock in the former and investing the proceeds in the latter?
2. A merchant failing in business can pay 76c. on the dollar. He offers to pay his whole indebtedness in 5 years if his creditors will allow him to go on with his business. His offer being accepted, how much will his creditors lose in the 5 years if money is worth 7% simple interest and the merchant pays no interest on his indebtedness?
3. A merchant purchased in Montreal goods costing \$2060 on the following terms: 6 mo. credit or 5% off for cash. He chose the latter and kept the goods for 60 days before selling them; he sold them on 1 year's credit at 20% advance. What were his profits on the whole transaction?
4. What was the cost to the wholesale dealer of goods sold by the retailer for 140 guineas, if the wholesale dealer makes a profit of 5% and the retail dealer  $16\frac{2}{3}\%$ ? Give answer in Canadian currency.

## TAXES AND DUTIES.

5. If the rent of 18 ac. for 3 mo. be \$60, what should be the annual rent of a farm of 540 ac. whose average quality is only half as good as that of the former? And if the land tax is  $1\frac{1}{2}\%$  on  $\frac{3}{4}$  of the value of the land, find the amount of taxes payable on the 540-ac. farm if the rent paid is 10% of the value of the land.

1. A grocer buys 150 lb. coffee at 14c. per pound, and 39 lb. chicory at 6c. per pound; he pays an import duty of  $12\frac{1}{2}\%$ , *ad valorem*, and mixes and sells them at 25c. per pound, but by the use of a false weight gains  $\frac{1}{4}$ -oz. on every pound sold. Find the percentage of profit made on the outlay.
2. Define (a) a tax, (b) direct tax, (c) poll tax, (d) indirect tax, (e) property tax.
3. Find the duty payable on 86  $\frac{1}{2}$ -hhd. of currants weighing on an average 471 lbs., at 7c. per pound, allowing a reduction of  $8\frac{1}{2}\%$  for *tare*.
4. The taxable property of a certain school district in P. E. Island is valued at \$19450. If the following amounts are voted at the annual school meeting to run the school for the current year, find the amount of school tax payable on a farm valued at \$2400, supposing there are 11 persons in the district who pay a poll-tax of \$1 each: Supplement to teacher's salary, \$35; contingent expenses, \$28.40; schoolhouse repairs, \$98.
5. An estate in Ireland was let for £480 a year, less a landlord's tax of 15d. in the pound. If the rent is reduced to £450 a year and the taxes rise to 16d. in the pound, by how much per cent. will the landlord's profits be reduced?
6. The rental of a house is  $11\frac{1}{2}\%$  of three-fourths its value, and the taxes are  $40\%$  of the rental. What is the value of the house if the taxes amount to \$46?
7. The expense of supporting a district school for a year is \$398.60. Of this amount \$225 is paid by Government. The rate of 5c. on the dollar is levied to pay the balance and proves insufficient by \$10.17 $\frac{2}{3}\frac{1}{7}$ . What is the assessment of the district?

1. If the village of Tignish, which has \$50000 of taxable property, is assessed \$1130, what is A's tax if his property is valued at \$1400?

### SQUARE AND CUBE ROOTS.

2. Find the square root of 49069800840256.  
 3. Find the square root of  $64.4452160493827$  and of .00004096.

4. Simplify  $\frac{\sqrt{1.002001} + \sqrt[3]{160103007}}{\sqrt{101\frac{92}{169}}}$ .

5. Divide the cube root of 857375000 by  $\frac{1}{6}$  of 123 of  $\frac{2}{3}$  of  $(\frac{1}{4} + \frac{3}{5} - \frac{2}{7})$  of  $\frac{1}{15}$  and diminish the result by the square root of 103266244.

6. Arrange in order of magnitude:

$$(2.403)^2, \frac{1}{\sqrt{8}}, \sqrt{557.196025}, .635, \sqrt[3]{4.096}.$$

7. The cubic contents of the interior of a box is 1296 cu. in. If the box is made of 1-in. boards and has a cover, and the length, width, and depth of the box are in proportion to each other as 5,  $3\frac{1}{2}$ , and 2, find the cost of painting the outside of the box at 15c. per square foot.

8. A cubical tank is to be built to hold 200 gal. of water. What must be its depth?

9. Give the rule for finding the cube root of a common fraction.

10. Seven-eighths of the square of a number is  $315\frac{7}{8}$ . What is the number?

11. Find the value of

$$\frac{\sqrt[3]{250} \times \sqrt[3]{324}}{\sqrt[3]{9216} \times \sqrt[3]{2304}} \div \text{G.C.D. of } 945, 1560, \text{ and } 22683.$$

1. Prove by an example that the square root of the product of two or more numbers is equal to the product of their square roots.
2. The square of twice a number is 196. What is the number?

### MEASUREMENTS.

3. A circle and a square each has a circuit of  $15\frac{1}{3}$  ft. Which has the greater area?
4. A piece of land is 330 ft. long, and contains 15 sq. chains. What is its width?
5. How many sleepers, placed 2 ft. apart, and how much iron using 25 lb. to the yard of rails, will be required to construct 15 mi. of the Belfast Murray Harbor Railway?
6. Find the cost of the lumber for the dressed door facings of 30 doors, each 7 ft. high and  $2\frac{2}{3}$  ft. wide, the facings being 6 in. wide, at \$18 per M feet.
7. A box whose base is square contains 11 cu. yd. 10 ft. 945 in., and is 2 ft. 3 in. high. Find its width.
8. A garden is  $24\frac{1}{2}$  rd. long and  $13\frac{1}{2}$  rd. wide. Find the cost of digging a ditch round it  $2\frac{1}{2}$  ft. wide by 4 ft. deep, at  $6\frac{1}{2}$  c. per cubic foot.
9. What will it cost to survey 12 mi. of the Belfast Railway at \$2.25 a chain?
10. If the diameter of a circle is 12, what is the area of a semicircle formed from it?

## EXCHANGE.

1. Find the cost of the following draft, exchange being  $\frac{1}{2}\%$  premium and interest 6%:—

\$688. Charlottetown, P.E.I., May 1st, 1902.

Thirty days after sight pay to W. P. Gundy or  
bearer, six hundred eighty-eight dollars, value  
received, and charge the same to the account of

G. J. McCormac.

To Royal Bank of Canada, Toronto.

2. Find the cost of a draft for \$1745 on Halifax at  $\frac{1}{8}\%$  premium; also find the cost of the same draft at  $\frac{1}{4}\%$  discount.
3. How large a sight draft on Chicago at  $\frac{3}{4}\%$  premium can be purchased for \$746?
4. If £1 stg. exchanges for 24.8 fr., and the French 3 per cents are selling at 70.2 fr., what sum of English money will I pay for  $19041\frac{2}{3}\frac{9}{11}$  of the French 3 per cents?
5. A gentleman in Moncton wishes to pay a bill of \$1400 in St. Paul, Minn. What must he pay for a 60-day draft, exchange being  $\frac{1}{8}\%$  premium and the rate of discount being 5 %?
6. Define (a) exchange, (b) domestic exchange, (c) foreign exchange, (d) bill of exchange, (e) drawer, drawee, and payee.
7. A merchant in Liverpool owes a debt of 1750 pistoles to a gentleman in Barcelona. Does he gain or lose, and how much, by sending the amount to Barcelona by way of France, the exchange being £1 = 24.4 fr., 19 fr. = 1 pistole, and 4 pistoles = £3?
8. What is the face of a draft on St. Petersburg which can be purchased for \$647.50 when the rouble is quoted at \$.565?

1. If the rupee = \$.323, what will be the cost of a bill of exchange on the Bank of Calcutta for 2000 rupees bought at St. John, exchange being 8 % premium?

2. A man leaving Charlottetown for South Africa wishes to carry with him two bills of exchange, one on a bank in Brazil for 300 milreis and the other on a bank in Chili for such an amount as he can purchase with \$282. Find cost of the first bill of exchange and the face of the latter, the milreis being quoted at \$.562 and peso of Chili (\$.915) at 6 % premium.

### STOCKS.

3. I can obtain \$6 more per annum by investing a certain sum in 5 per cents at  $128\frac{1}{4}$  than in the 3 per cents at 81. What is the sum?

4. A person had a certain sum invested in 4 % stock. He sells it at  $117\frac{1}{4}$ , and invests half the proceeds in 2 % stock at 96, and the rest in 3 % stock at 99. He then finds that his annual income is reduced by \$20. What amount of the original stock had he?

5. I receive an income of \$1312.50 from 500 shares of \$50 each in a stock company. What is the rate of dividend?

6. The capital of a manufacturing concern consists of \$500000 preference stock, paying 4 %, and \$700000 ordinary stock. The working expenses amount to \$25000 a month, and the receipts average \$1000 per day. What dividend can be declared on the ordinary stock after \$24000 is added to a reserve fund?

7. If I buy \$1000 of 3 % stock at a discount of  $3\frac{1}{4}$  %, sell out again after the stock has fallen to  $82\frac{1}{2}$ , and invest the proceeds in  $3\frac{3}{4}$  per cents at par, what do I lose in capital by the whole transaction?

## 92 PRACTICAL PROBLEMS IN ARITHMETIC.

1. If stock bought at 10% premium pays 8% on the investment, what per cent. would it pay if bought at 10% discount?
2. A person invests \$56400 in the 3 per cents. selling at a discount of 6%. When they rise to  $95\frac{1}{2}$  he sells out \$20000 of his stock, and he sells the remainder when they have fallen to  $87\frac{3}{4}$ . He then invests the proceeds in the 5 per cents at 108. What does he gain or lose by the transaction?
3. When the 3 per cents were at 90, I found that by selling out and investing in Boughton Island 4 per cents at 95 I could increase my income by £24 $\frac{3}{5}$ . Find the amount of my stock in the 3 per cents.
4. A person intending to purchase enough 5% stock to yield an income of \$1158.50 per annum when the stock is at 95, delays until the price has risen to  $95\frac{1}{2}$ . How much more will he then have to pay?

## SHARING AND PARTNERSHIP.

5. *A*, *B*, and *C* had equal shares in a Panmure Island lobster-canning establishment. In 1900 they sold respectively  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and  $\frac{1}{5}$  of their shares to *D*, but in 1902 *D* retired from business and sold his share in equal parts to the original owners. If *A*'s and *C*'s interest in the establishment is now worth \$795 $\frac{5}{8}$ , what is the value of *B*'s share?
6. A man divides among his sons William, Louis, and Henry the sum of \$948 so that three times the sum William receives equals five times what Louis gets and eight times what Henry gets. Divide the money.

1. *A* owns  $\frac{1}{3}$  of a vessel and *B* the remainder; the vessel is sold, *A* receiving 30% of his share in cash and *B* 10% of his. *A* afterwards received \$500, and the balance was then equally divided between them. For how much was the ship sold?

2. Fay and Johnston invest capital in a general merchandise business in the proportion of  $4\frac{1}{2}$  to  $6\frac{1}{2}$ . After 5 mo. Fay withdraws  $\frac{1}{3}$  of his capital and Johnston withdraws  $\frac{2}{3}$  of his. At the close of the year they have made in profits \$6678. What is each partner's share?

3. John Bell sold  $\frac{3}{10}$  of his estate, bequeaths  $\frac{2}{9}$  of it to his son and  $\frac{2}{3}$  of the remainder to his wife. The balance of it he gives to three public institutions, as follows: To a hospital he gives \$263.80, to a public library 15% less than he gave to the hospital, and to a school 20% more than he gave to the library. Find the value of the estate.

4. *A* and *B* enter into partnership and agree to divide the profits according to the capital invested by each. *A* puts in \$896 in cash, *B* puts in \$672 in cash and a note at 5 mo. for \$348. If the note is paid at maturity how should an annual profit of \$706 be divided between the partners?

5. *A* and *B* enter into partnership, *A* contributing \$500 and *B* \$300; at the end of 9 mo. they take *C* as a partner, who brings with him a capital of \$1000. The profits, \$1000, being divided at the end of another 9 mo., what shares did they each receive?

6. A person owes \$1000 to three creditors, *A*, *B*, and *C*. His debt to *B* is  $1\frac{1}{2}$  of what he owes to *C*, and his debt to *C* is  $1\frac{1}{3}$  of what he owes to *A*. To *A* he pays  $\frac{1}{6}$  of his debt, to *B*  $\frac{2}{3}$  of his, and to *C*  $\frac{11}{20}$  of his. How much does he still owe?

7. Divide \$7000 among fifteen persons so that one may have \$250 more than each of the others.

## ANSWERS.

### PAGE 7.

1. 24 minutes. 2. 1560; 936; 1040 ac. 3. 662256000 sec.  
4. 18.15c. 5. £1088.8*1*d.; 9,9375. 6. 50.  
7.  $35\frac{1}{2}$ ;  $40\frac{1}{3}$ .

### PAGE 8.

1. 1. 2.  $62\frac{1}{2}$ c.; \$2875. 3. 8 ac., 129,518 sq. yd. 4. 8.  
5. \$1997.50. 6. The frs. are equal to  $\frac{1}{36}$ ,  $\frac{1}{36}$ ,  $\frac{1}{36}$ ,  $\frac{1}{36}$ ,  $\frac{1}{36}$ .  
7.  $3\frac{1}{2}$  dy. 8. \$200,81400. 9. 972360000 mi. 10. 2161.06 sq. yd.

### PAGE 9.

1. 58. 2. In 400 hrs.; 2 min.  $46\frac{2}{3}$  sec. to 4 a.m.; 2 min.  $13\frac{1}{3}$  sec. after 4 a.m.  
3.  $36\frac{1}{2}$ %. 4. 1.32; 64.25; .0037523. 5. \$462.47+. 6. twice.  
7. \$183.21. 8. .05. 9. ——  
10. 17695260 in.;  $3\frac{1}{2}$ . 11. 10 oz.

### PAGE 10.

1. *A*, 15 dy.; *B*, 10 dy.; *C*, 12 dy. 2. 700.86. 3. 123456789.  
4. \$1.47. 5. 47 lb. 6. \$9.86*1*. 7.  $4\frac{5}{34}$ .  
8. \$160920; 200 mi. 9. 403291461126605635584000000.  
10. 50 leagues.

### PAGE 11.

1.  $\frac{1}{4}$ % gain. 2.  $12\frac{1}{2}$ %. 3. 10,0045.  
4. 124 ac. 1 ro. 1 po. 5. 50,2656 sq. yd. 6. .00091875.  
7. 2 yr. 4 mo. 18 dy. 8. 4 %. 9. 38.  
10. Length, 32 ft.; breadth, 16 ft.; height, 8 ft.  
11.  $5742\frac{3}{8}$  lb. 12.  $38\frac{8}{9}$ %.  
13.  $10511\frac{1}{5}$  sq. yd.;  $2955\frac{5}{9}$  sq. yd.

## PAGE 12.

1. 75 ft.	2. (a) ML, (b) MDCCXCIII
3. 9 hr. 11 min. 43 $\frac{1}{2}$ sec.	4. \$65.90.
5. 50,9312 ac.	6. £49 17s. 0½d.
7. 6 ft. 2 $\frac{1}{2}$ in.	8. \$3000.
	9. £17 15s. 6½d.
	10. 32 $\frac{2}{3}$ .

## PAGE 13.

1. Circle; 10 $\frac{1}{2}$ rd.	2. 400; 787.	3. ... 10000.
4. Blacksmith; \$11.32 $\frac{1}{2}$ .		5. \$55.93.
6. 9 $\frac{1}{2}$ sq. ft.		7. \$1520.

## PAGE 14.

1. \$14.40.	2. 4 %.	3. — — —.	4. 4560 lb.
5. — — —.	6. 13 $\frac{1}{2}$ c.	7. 23.800523.	8. \$378.
9. 5 %.	10. 120 hr.		

## PAGE 15.

1. \$7.40.	2. 1 cu. yd.	3. June 16, 1901, 67 dy.; \$176.23.	
4. 5.	5. <i>A</i> and <i>B</i> receive \$111 $\frac{1}{2}$ and \$77 $\frac{1}{2}$ respectively.		
6. .677857142.		7. \$235.57.	

## PAGE 16.

1. 125.	2. \$34275.	3. 2 $\frac{1}{4}$ yr.	4. June 8th, 1901.
5. \$20969.51.	6. 400 ft.	7. 178332.	8. 30 sq. rd.
9. \$22740.	10. 1 $\frac{7}{10}$ mi.		

## PAGE 17.

1. 7 $\frac{1}{2}$ ft.	2. 250 lb.	3. \$40.39.	4. 12 $\frac{1}{2}$ fr.
5. (a) 2039750, (b) 2.403, (c) 12.4007, (d) 3789.			6. \$1600.
7. 8045 $\frac{1}{2}$ times.			

## PAGE 18.

1. 16s. 7d.	2. 96.	3. 47.15c.	4. 57 $\frac{1}{2}$ yd.; \$6.80.
5. 73.44 ft.	6. 24 dy.	7. 8 $\frac{1}{2}$ s.	8. 6 $\frac{2}{3}$ hr.
9. \$89686988.537 $\frac{1}{2}$ ; 40038 $\frac{997}{100}$ dy.			

## PAGE 19.

1. 40 ft.	2. 3 o'clock.	3. \$54.28.
4. 102 first, 38 second, 100 third.		5. 50 % above cost
6. \$6.19 $\frac{1}{4}$ .	7. $\frac{1}{4}$ .	8. 292 $\frac{1}{2}$ bbl.

## PAGE 20.

1. \$6.50.	2. 480 rd.	3. 1838 ft. 7 + in.
4. \$200.	5. 10861578.	6. 1 mi. 524 yd.
7. 54, 51, 48, 39, 36.		8. 18 $\frac{1}{4}$ ; 3 $\frac{1}{2}$ .

## PAGE 21.

1. 12608000000.	2. 20 rd.	3. 1 $\frac{1}{2}$ .	4. 7s.
5. A, \$234; B, \$266.40; C, \$306; D, \$345.60.			6. 700 sq. ft.
7. 2008000.	8. A, 20; B, 30; C, 50.		
9. A, \$384.929; B, \$250.71; C, \$236.36.			

## PAGE 22.

1. $\frac{9}{25}$ .	2. 4568 ft.	3. $\frac{1}{3}$ .	4. 7.976d.
5. \$96.	6. $16\frac{2}{3}$ hr.	7. \$195.	8. \$15.24 $\frac{1}{2}$ .
9. \$36 $\frac{2}{3}$ lost.			

## PAGE 23.

1. (a) 117.79 + ft., (b) 90.97 + ft., (c) 84.71 ft., (d) 93.45 ft., (e) 113.26 + ft., (f) 129.74 + ft.	2. \$1304.61 +.
3. (a) 12 cu. ft., (b) 864 sq. ft., (c) 17 ft. nearly.	4. $27\frac{7}{9}$ %.
5. $26\frac{1}{3}$ .	6. $11\frac{24}{30}$ .
	7. .322830 +.

## PAGE 24.

1. A, \$8; B, \$6.	2. 21 sq. yd., 5 sq. ft., 36 sq. in.	3. 302.97 ft.
4. \$7176.96.	5. $17\frac{1}{2}$ % gain.	6. \$1114.74.
7. 201.22 ft.		

## PAGE 25.

1. $\frac{8}{7}$	2. $7\frac{7}{3}$ ft.	3. 600.	4. \$1280.
5. 51 d. 167 ft. 9 + in.		6. No; 88 cu. ft. yet due.	
7. 20 dy.		8. $1\frac{1}{2}$ pure wine.	

## ANSWERS.

97

### PAGE 26.

1. 76.	2. $12\frac{1}{2}$ ft.	3. 25.	4. \$7.50.
5. \$742.40.	6. 25 %	7. 56 ft. $7\frac{1}{3}$ in.	8. $2\frac{1}{4}$ ft

### PAGE 27.

1. \$4060 gain.	2. \$1.57 $\frac{1}{2}$ .	3. _____.	4. $\frac{1}{4}$ ac.
5. .003.	6. 45000 qt.; cheese by \$750 and \$1500.		
7. A, 21 dy.; B, 28 dy.		8. 141.0625 yd.	9. $\frac{1}{2}\%$ .

### PAGE 28.

1. 3600.	2. _____	3. $1\frac{7}{10}$ mi., nearly.	4. 434.26 lb.
5. \$652.08.	6. \$528.03.	7. 5.7 in.	
8. Eastward, $36^{\circ} 15'$ .			

### PAGE 29.

1. \$12000.	2. 24.3474 sq. ft.	3. \$10.68.	
4. 35 nearly.	5. $13\frac{1}{2}$ tons.	6. 3 cwt. 6 lb. 3 oz.	
7. Gain \$132.30.	8. 37.4765625 cu. ft.	9. 4180680 sq. mi.	

### PAGE 30.

1. 7230.	2. 58.	3. \$288.	4. \$1790.93 $\frac{1}{3}$ .
5. \$780.40.	6. 15169 sq. links.	7. 12.205 rd.	8. 39 %.
9. \$464.	10. £35 15s. 4d.		

### PAGE 31.

1. 16.	2. .005937234 +.	3. 18s. 6d.	4. 176.87 sq. yd.
5. 1466 $\frac{2}{3}$ yd.	6. $22\frac{1}{8}$ ac.	7. 20 dy.	8. 44.21 ft.
9. $9\frac{1}{2}$ hr.			

### PAGE 32.

1. MDC.	2. 1.4456	3. \$109.	
4. 800080008800080.	5. \$1661.25.	6. 31556160 min.	
7. 4 dy. 18 hr. 22 min. 3 sec.	8. \$300.	9. \$725.	
10. 1 yr. 4 mo. 21 dy.	11. \$71.05.		

### PAGE 33.

1. $58\frac{7}{12}$ dy.	2. $140\frac{4}{5}$ tons.	3. .006.	4. \$23.688.
5. \$117.60.	6. 215.	7. _____	8. 32.07 + ft.
9. $3\frac{1}{5}\%$ .	10. $2\frac{2}{3}$ yr.	11. $769\frac{3}{3}$ lb.	12. 446 $\frac{1}{3}$ .

## PAGE 34.

1. 1 fur. 12 po. 4 yd. 1 ft. 6 in. 2. —————. 3. \$1.50.  
 4.  $78\frac{3}{4}$ ,  $108\frac{1}{4}$ , 140,  $75\frac{1}{2}$ . 5. 99 yd. 6. \$60.  
 7. \$16.50, \$22.50, \$15. 8. \$1.59. 9. —————.  
 10.  $.075\%$ ;  $\frac{1}{140}$ ; —————. 11. \$12.54.

## PAGE 35.

1. 52 shares. 2.  $984\frac{1}{4}$  ft. 3. \$4.  
 4.  $.005937234+$ . 5.  $37\frac{1}{2}$ . 6. A, \$120; B, \$180.  
 7.  $3\frac{3}{4}$  min.; 10 mi. an hour. 8. \$17.53.

## PAGE 36.

1. 112.64 yd. 2. —————; 95 yr.  
 3. 1416350 min. 4. —————.  
 5. \$147.51. 6. 1820 ft.;  $195\frac{1}{3}$  sq. ft.; 60 cu. ft.

## PAGE 37.

1. 2 mi. 2. 48 hr. 45 min. 5 sec. 3. \$1020.70. 4.  $31\frac{1}{2}$  sq. ft.  
 5. 3000. 6.  $44\frac{7}{8}$ . 7. \$8.65+. 8.  $2\frac{7}{8}$  hr.  
 9. A, \$1950; B, \$1500. 10. 130 boards; 1040 ft.

## PAGE 38.

1.  $\frac{4}{3}$  2. 75 cu. ft. 3. 39 bu. 42 bu.  
 4. 210000 oz. 5. A, \$50; B, \$240; C, \$360. 6. 128; 2304.  
 7. 255255. 8. 12 dy. 9. \$50 loss.  
 10.  $116\frac{3}{4}$ . 11. \$4752.

## PAGE 39.

1. 4400 steps;  $2\frac{1}{4}$  mi. 2.  $11\frac{1}{2}$  rolls. 3.  $16\frac{1}{4}\%$ .  
 4. \$3.91. 5. \$22 gain. 6. —————

## PAGE 40.

1.  $6\frac{2}{3}\frac{3}{5}\frac{1}{6}$ . 2. \$3501.26+. 3. 1 ft.  
 4. 960; 44; 90; 150. 5.  $1\frac{1}{6}$  ft. nearly. 6. 28034 lb.  
 7. \$317.32. 8. \$438 $\frac{1}{4}$ .

## PAGE 41.

1. ——. 2. \$1273 $\frac{1}{2}$ . 3. \$195. 4. \$14.70.  
 5. 13.68 mi. 6. \$2555.52. 7. 18 ft. wide by 24 ft. long.  
 8. 900 bbl. 9. \$104.23 nearly. 10. .078834+.

## PAGE 42.

1. \$1300. 2. \$372.44 $\frac{5}{8}$ . 3. 18 ft.  
 4. 3450 men. 5. 3 p.m. 6. 961.  
 7. 20000019019; DCV.; 1550. 8. 5900. 9. 500; .002; one.  
 10. 9.

## PAGE 43.

1. \$20.86+. 2. 800 trees. 3. \$68.75 increase.  
 4. \$20 gain. 5. 12 boxes. 6. 1 ton 16 cwt. 1 qr. 5 lb.  
 7. \$420. 8. 87.1792 cu. ft.

## PAGE 44.

1. 62 225 yd.; 44 yd. 2. 24 mi. 3 fur. 27 pr. 4 yd. 10 in.  
 3. 18 dy. 4. \$2180. 5. \$740.66.  
 6. \$40.50. 7. 416 yd. 8. 9.797 ft.  
 9. \$9866. 10. \$12576.30 11. 32.21 ft.

## PAGE 45.

1. ——. 2. \$33.60; 15 $\frac{3}{16}$  cords. 3.  $\frac{7}{5}$ . 4. 105 mi.  
 5. 33 $\frac{1}{2}$ . 6. 271 $\frac{1}{4}$  lb. 7. £33. 8.  $\frac{5}{14}\frac{8}{7}\frac{5}{8}$ .  
 9. 15c. 10. \$38.40.

## PAGE 46.

1. 30 $\frac{2}{3}$  % on list price; 36 %. 2. \$18.75. 3. \$25.43c. gain.  
 4. 2068 $\frac{1}{2}$  times nearly. 5. 11.107 yr. 6. 4 $\frac{8}{11}\frac{6}{11}$  %.  
 7.  $\frac{5}{2}$ . 8. ——. 9. \$202.50. 10. 3 mi. 6 fur. 32 $\frac{1}{2}$  o.

## PAGE 47.

1.  $\frac{512}{1335}$ . 2. September 9th. 4.  $\frac{1571}{1581}$ .  
 5. \$378.74 $\frac{1}{2}$ . 6. 3 hr. 13 min. 40 sec. 7. £3 17s.  
 8. 423.613+. 9. 56322. 10. 54.

## PAGE 48.

1. 4.16221140132031.	2. \$1914.2789 +.	3. 5½d.
4. 6.	5. 5 <sup>2</sup> <sub>1</sub> <sup>6</sup> <sub>2</sub> <sup>3</sup> <sub>6</sub> .	6. £1 5s. 8½d.
7. 7911.7 mi.	8. 4 min. 7½ sec. past 3 p.m.	
9. 13s. 11½d. nearly.	10. 1003.003001; 257.16787.	

## PAGE 49.

1. 24 times.	2. 276 tons.	3. A wins by ½ mi.
4. 88f. 93e.	5. 1380 <sup>1</sup> <sub>1</sub> English acres.	6. 11 dy.
7. 28.125 ft.; 7.68.		

## PAGE 50.

1. 3 ac. 15 po.; \$6.06.	2. £18 15s. 8½d.
3. A, 40 ft.; B, 36.66 ft.; C, 41.42 ft.	4. 526½.
5. 28.284 + rd.	6. 1 mil. 6 fur. 27 + rd.
	7. 36 ac. 3 ro. 38.88 po.

## PAGE 51.

1. £47 16s. 3d.	2. 1437½ bricks.	3. £5313 8s. 0½d.
4. 8 chains.	5. \$442.47 +.	6. 64½.
7. \$51.33½	8. May 2nd.	9. \$29.02½.

## PAGE 52.

1. A, $\frac{5}{4}$ ; B, $\frac{5}{6}$ ; C, $\frac{5}{8}$ ; D, $\frac{5}{24}$ .	2. \$544.39.	3. 1029.12 ft.
4. 30 mi.	5. \$1800.	6. \$3.20 $\frac{1}{2}$ .
7. \$313.17 $\frac{3}{16}$ .	8. 533.43 ft.	9. \$3752.95.
		10. 108 ft.

## PAGE 53.

1. 5 mo.	2. 300; 56250.	3. \$3318.05.
4. \$63.05.	5. 295 boards; \$7.09 nearly.	6. 32 yd.
7. 510 lb.	8. \$10754.75.	

## PAGE 54.

1. \$56.	2. 51 $\frac{1}{2}$ , 68 $\frac{1}{2}$ .	3. $\frac{2}{3}$ .	4. \$6.1192808 +.
5. \$6.12.	6. 336 ft.	7. 12 $\frac{2}{5}$ $\frac{2}{5}$ .	8. 8 $\frac{1}{2}$ $\frac{1}{2}$ %.

## PAGE 55.

1. 82 $\frac{1}{2}$ e.	2. 4 ac. 29 po. 26 yd. 81 in.	3. \$9.75.
4. \$2.30.	5. \$130.41c.	6. A, \$6, B, \$4.
7. 1.1.	8. \$152.	9. 66 ft.
		10. 2 yr 24 dy.

## PAGE 56.

1. \$45.      2. \$74.81 $\frac{1}{4}$ .      3. A, \$3240; B, \$1260; C, \$1260  
 4. \$306.72.      5. 28.      6.  $103\frac{1}{3}\frac{1}{3}$  ac.      7. 30 ft.  
 8. \$1200 each loan.  
 9. \$2500 to son, \$750 to wife, \$750 to daughter.      10. 4623 $\frac{1}{4}$ .

## PAGE 57.

1. \$270 horse; \$70 harness.      2. 35 leaps.  
 3. \$405.90; 25247 lb.      4. Dec. 15, 1901; June  
     13, 1902.  
 5. 120.      6. \$1526.40.      7. \$2000.  
 8. A, \$270; B, \$280; C, \$310; D, \$320.      9. 1720.

## PAGE 58.

1.  $\frac{1}{3}\frac{2}{3}$ .      2. \$150.      3. \$152.37; \$152.96.      4. \$3566.35.  
 5.  $4\frac{1}{2}$  ft.      6. 1280 cattle.      7. \$200.      8.  $8\frac{1}{4}\%$ .

## PAGE 59.

1. \$9000.      2. 3 hr.      3. A, \$193.55; B, \$206.45.      4. \$11.57.  
 5. 42.52 + ft.      6. \$14812.      7. \$44.15.

## PAGE 60.

1. 50 %.      2. \$2160.      3. 25 ft., 35 ft.      4. 960 cu. ft.  
 5. \$6703.07.      6. ——.      7. \$120.      8. \$55000.

## PAGE 61.

1. 120 yd.      2. \$95.40.      3. 105 lb.; 14 $\frac{2}{3}\%$ .      4. \$40 gair.  
 5. 480.      6. 16 da.      7.  $6\frac{2}{3}$  in.      8. 216 ac.      9.  $1\frac{3}{4}\%$ .

## PAGE 62.

1. 4.54 litres.      2. £10 8s.      3. \$45.10.      4. 2835 cu. in.  
 5. ~~21120700000~~.      6. 52 dy.  
 7. 14 @ 42c., 3 @ 60c., 4 @ 67c., 22 @ 78c.      8. 72.

## PAGE 63.

## MISCELLANEOUS.

1. \$9.12.      2. \$616.66 $\frac{2}{3}$ .      3.  $\frac{167}{100}$ c. in dollar; \$1.84 $\frac{1}{4}$ .  
 4. A, \$2352; B, \$2310.      5. 100.1001.  
 6. 4 dwt.  $17\frac{2}{3}\frac{3}{4}$  gr.      7. 96 bu.      8. 392.

## PAGE 64.

1. 4 %.      2. \$9.09.      3. A, \$2.50; B, \$1.87 $\frac{1}{2}$ ; C, \$1.56.  
 4. \$15.06.      5. \$28.57 $\frac{1}{2}$ .      6. £1 2s. 2 $\frac{1}{2}$ d.  
 7. \$164.50.      8.  $1\frac{9}{10}\frac{1}{2}\frac{1}{2}$  %.

## PAGE 65.

1. \$8855.04 loss.      2. 22 $\frac{1}{2}$  dy.      3. 5.0420168067.  
 4. £7 16s. 4d.      5. \$375.      6.  $\frac{3}{5}$ .      7. 1262.

## PAGE 66.

1. \$5500; \$5078 $\frac{1}{2}$ .      2. 7.92 in.      3. 7 dy.  
 4. 1 lb. feathers, 2 oz. 11 dwt. 16 gr.; 1 oz. gold heavier by 42 $\frac{1}{2}$  gr.  
 5. 101.854+.      6. 1.966.      7. .00054.  
 8. 464.      9. 64 men.

## PAGE 67.

1.  $5\frac{255}{36}$ .      2. 114; XMCMLXXXIII.      3. 338500.  
 4.  $10\frac{1}{4}$ ;  $19\frac{5}{8}$ .      5. 4808880.      6. 800.000.      7.  $6\frac{27}{4}$ .  
 8. —.      9. \$16.35.      10. \$50.      11. 64.521.

## PAGE 68.

1. A, \$47.25; B, £43.80.      2. \$40.50.      3.  $621\frac{7}{8}\frac{28}{7}\frac{9}{1}$ .      4. \$740.66.  
 5. 416 yd.      6. \$2180.      7. —.      8.  $43\frac{3}{7}$  lb.  
 9. A, \$640; B, \$840; C, \$840.      10. \$110.

## PAGE 69.

1. \$7.57 $\frac{1}{2}$ .      2. 1.291875.      3. \$19.91 $\frac{1}{2}$ .      4.  $7\frac{3}{2}\frac{4}{6}\frac{4}{4}\frac{10}{9}$ .      7. \$12.50.

## PAGE 70.

1. (a) 18267.37698. (b) 68.8616. (c) 1.65926.  
 2. (a) 101010. (b) 345. 3. .22233. 4. £62 8s. 7½d.  
 5.  $62\frac{1}{2}\%$ ;  $15\frac{1}{2}\%$ ; 60%. 7. \$1.50. 8. 3006 gal.  
 9. 10 dy

## PAGE 71.

2. 27; .816; .75; 8.175; 135.1940625. 3. .6875.  
 4. 54772; 4.044; 10.535; 16.104; .06324.  
 5. Men, £35; women, £56; children, £35. 6. 33, 18.  
 7. 785. 8.  $10\frac{1}{2}$  min.  
 9. .2154; 32.1; 4321; 1.357. 10. 168 $\frac{1}{2}$  8 $\frac{1}{2}$ .

## PAGE 72.

## PROPORTION.

1. £7 9s. 2. 300. 3. \$73 $\frac{1}{2}$ . 4. A, 4; B, 3 $\frac{1}{2}$ ; C, 2 $\frac{1}{2}$ .  
 5. 1 hr. 47 min.  $23\frac{2}{11}$  sec. 6. 180 men.  
 7. Soldiers, 9 ac. 12 rd.; sergeant, 18 ac. 24 rd.; ensign, 72 ac.  
 2 ro. 16 rd. 11 sec.; lieutenant, 108 ac. 3 ro. 24 rd.; cap-  
 tain, 181 ac. 2 ro.; major, 272 ac. 1 ro.; colonel, 458 ac.  
 3 rd.; \$22487.85.

## PAGE 73.

1. 10.34 $\frac{2}{3}$  a.m. 2. Boy's work is to man's as 1 is to 3.  
 3. 2 yr. 4. 10 hr.

## INTEREST AND PERCENTAGE.

5. 17 yr. 6.  $9\frac{1}{2}\%$ . 7. \$762.50. 8. \$12 4.

9. \$78.50.

## PAGE 74.

1. \$5000. 2. \$72.14. 3. \$1200. 4. \$2851.14.  
 5. \$1274.50. 6. Feby. 14th, 1885. 7. \$17425.  
 8. \$35.10.

## FRACTIONS.

9.  $2\frac{1}{2500}$ .

## PAGE 75.

1. .51. 2.  $122\frac{1}{4}\%$ . 3.  $24\frac{2}{3}\%$ . 4.  $77\frac{2}{8}\frac{1}{2}\%$ .  
 5.  $24.\dot{2}8009\dot{5}$ . 6. 2.075645161290322580. 7. 3 times.  
 8.  $2\frac{50697}{97395}$ .

## PAGE 76.

1. \$6160.

## PRESENT WORTH AND DISCOUNT.

2. \$49.04.

3. \$126.18.

4. 84c.

5. \$36.50.

6. \$809.01.

7. \$100.

8. \$320.62 $\frac{1}{2}$ .

9. 4 %.

## PAGE 77.

1. \$6809.21.

2. \$195.12 $\frac{1}{4}$ .3.  $\frac{1}{4}$  % loss.

4. ——.

5. \$7848.15 +.

6. \$706 $\frac{1}{2}$ .

## STOCKS.

7. 70.

8. \$243.05 + stock.

9. \$600000.

## PAGE 78.

1. \$300.

2. \$1960.

3. \$578.31.

4. \$10000.

5. \$19.79 $\frac{1}{2}$  loss.

6. \$69418.

7. 86c.

8. \$15000.

9. 114.

## PAGE 79.

## MENSURATION.

1. 56 sq. ft.; none.

2. 645 sq. rd.

3. \$145.31 $\frac{1}{2}$ .

4. \$247.15.

5. 1 $\frac{1}{2}$  ft. from sides, 4 ft. from ends; 20 $\frac{1}{2}$  sq. yd.

6. \$20.95.

7. 31 sq. ac. 10 po. 8. 40.32.

## PAGE 80.

1. 61.498 ac.

2. 67.74.

3. 6347 $\frac{1}{4}$  ft.

4. 5 ac. 1 ro. 9 fur.

5. 553.632 sq. ft.

6. 130.381.

7. 342.08 sq. yd.

8. 106.8144 ft

9. 19.624.

10. 38.51672.

11. 98.175.

12. 2629 $\frac{1}{2}$  gal.13. 201 $\frac{1}{2}$  cu. ft.

## PAGE 81.

1. 477.48 cu. ft.

2. 8.83575 cu. ft.

3. 7.0686 sq. ft.

4. 24428.

5. 23 ft. nearly.

6. 53 ft.

7. 20 ft. nearly.

8. 5.039 in.; 3.78 in.

9.  $60\sqrt{3}$  —.

10. 53 ft.

11. 58.876.

## PAGE 82.

1. 20 in.      2. 42.5195.      3. 41.803; 12 ft.

## DECIMALS.

4. (a) 2.045, (b) 9.0052, (c) 69.68703, (d) 80.73835016.  
 5. 16.01397.      6. 1 bu. 2 qt. 1 pt.      7. £31 2s. 6½d  
 8. 99.84436.

## PAGE 83.

1. 258.0645 +.      2. .010418448.      3. 4s. 4½d.  
 4. 3 mi. 2 fur. 21 po. 4 yd. 1 ft. 6 in.      5. .29752.

## PROBLEMS RELATING TO WORK.

6. 3 dy.      7. 3 dy. 12 hr. 46 + min.      8. \$6.40.

## PAGE 84.

1. \$49.93½.      2. A, \$16; B, \$12; C, \$8.      3. 9½ dy.  
 4. Tom, \$18.75; Dick, \$15; Harry, \$11.25.      5. 2½ dy.  
 7. \$372.      8. B, \$4; C, \$3.

## PAGE 85.

## PROFIT AND LOSS.

1. 20½ %.      2. ½ c. loss.      3. 60 %.      4. 18½ % gain.  
 5. 44c.      6. 85½ %.      7. \$272.34½ gain.      8. \$386.86.

## PAGE 86.

1. \$26.47 nearly, lost.      2. 2½ c. on the \$.      3. \$261056½ nearly.  
 4. \$584.

## TAXES AND DUTIES.

5. \$7200; \$675.

## PAGE 87.

1. 82½ % nearly.      3. \$324.89½.      4. \$18.55 +.      5. 6½ %.  
 6. \$1394 nearly.      7. \$26000.

## PAGE 88.

1. \$31.64.

## SQUARE AND CUBE ROOTS.

2. 7004894. 3.  $8.027$  and .0064. 4.  $16398\frac{1}{2}$ . 5.  $29687\frac{1}{2}$ .  
 6.  $\frac{1}{\sqrt[3]{8}}$ ,  $\sqrt[3]{4.096}$ ,  $(2.403)^2$ ,  $\sqrt{557.196025}$ . 7. \$1.15.  
 8.  $35.8 +$  in. 10. 19. 11.  $\frac{1}{4}$ .

## PAGE 89.

2. 7.

## MEASUREMENTS.

3. Circle. 4. 198 ft. 5. 39601 sleepers; 1320000 lb. iron  
 6. \$9.54. 7. 3 yd. 2 ft. 8 in. 8. \$185.36 $\frac{1}{2}$ . 9. \$1080.  
 10.  $56.548 +$ .

## PAGE 90.

## EXCHANGE.

1. \$685.13. 2. \$1747.18; \$1740.64. 3. \$740.44. 4. £539.  
 5. \$1389.50. 7. £3 8s. 10 $\frac{1}{2}$ d. 8. 1146.01 roubles.

## PAGE 91.

1. \$697.68. 2. \$168.60; 306.35 peso.

## STOCKS.

3. \$3078. 4. \$2000. 5.  $5\frac{1}{4}\%$ . 6. 3 %. 7. \$141.25.

## PAGE 92.

1.  $9\frac{7}{9}\%$ . 2. \$700. 3. £3078. 4. \$173.92 $\frac{1}{2}$ .

## SHARING AND PARTNERSHIP.

5. \$4044 $\frac{1}{2}$ . 6. W., \$840; L., \$288; H., \$180.

## PAGE 93.

1. \$35000. 2. F., \$3870.69; J., \$2807.31. 3. \$3847.85.  
 4. A, \$357.20; B, \$348.80. 5. \$384.61 $\frac{1}{3}$ , \$230.76 $\frac{1}{3}$ , \$384.61 $\frac{1}{3}$ .  
 6. \$600. 7. \$700 to one, \$450 to each of the others.

